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THE

AMERICAN EPHEMERIS

AND

NAUTICAL ALMANAC

FOR THE YEAR

1912

FIRST EDITION

PUBLISHED BY THE NAUTICAL ALMANAC OFFICE, U. S.
NAVAL OBSERVATORY, BY DIRECTION OF THE SECRETARY
OF THE NAVY AND UNDER THE AUTHORITY OF CONGRESS

DEPARTMENT OF THE NAVY
BUREAU OF EQUIPMENT

WASHINGTON
GOVERNMENT PRINTING OFFICE
1909

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PREFACE.

While the general arrangement of the matter contained in the American Ephemeris and Nautical Almanac for the year 1912 is the same as in the issues of previous years, yet advances in astronomy and navigation have made certain changes necessary. The more important of these are three in number, to wit,

a. The lunar distance tables have been omitted by authority of the Chief of the Bureau of Equipment, Navy Department, who found after investigation that they are no longer of practical use to navigators.

b. The vacancy of seventy-four and one-half pages thus created has made possible a large increase in the number of fixed stars without greatly augmenting the size of the book. The number of stars of which 10-day ephemerides are given has been increased from 378 to 800, and the number of circumpolar stars of which daily ephemerides are given, from 5 to 25, 15 of these being northern and 10 southern, the total number of stars being increased from 383 to 825.

c. The constants of nutation and aberration adopted by the Paris Conference of May, 1896, have been used in the body of the book, as they were in the volume for the year 1900, instead of the Struve-Peters constants, and Part IV, which contained ephemerides of stars computed with the constants of the Paris Conference, has been omitted.

The more important minor alterations will be mentioned elsewhere. The size of the printed page has been reduced from 8.65 by 5.58 inches to 8.25 by 5.00 inches, for the reason that the smaller size seems to be sufficiently large.

This volume is divided into three parts, as follows:

Part I, *Ephemeris for the Meridian of Greenwich*, which gives the ephemerides of the Sun and Moon, the geocentric and heliocentric positions of the major planets, the Sun's coordinates, and other fundamental astronomical data for equidistant intervals of Greenwich mean time.

Part II, *Ephemeris for the Meridian of Washington*, which gives ephemerides of the fixed stars, Sun, Moon, and major planets for transit over the meridian of the Naval Observatory, Washington, which passes midway between the West and East Transit Circles of the Observatory. The mean places of the fixed stars and the data for their reduction are also included in this part.

Part III, *Phenomena*, which contains predictions of phenomena to be observed, with data for their computation. Washington mean time for the meridian of the Naval Observatory is used throughout this part except in a few cases, notably those of eclipses, where Greenwich mean time seems more convenient.

MILTON UPDEGRAFF,
Professor of Mathematics, U. S. Navy,
Director Nautical Almanac.

WASHINGTON, *November, 1909.*

CORRECTIONS.

Ephemeris 1910, first edition only.

Page.			
235,	Dec. 32, Meridian Passage	*for* 21 45.8	*read* 21 45.6
267,	Dec. 32, Log. Dist.	*for* 0.7656854	*read* 0.765685
367,	*d* Boötis R. A. decrease the column of seconds by 0.1^s		
404,	Aug. 12, R. A., App. Noon	*for* 4.84	*read* 3.84

Ephemeris 1911, first edition.

261,	Dec. 33, Log. Dist.	*for* 9.9815309	*read* 9.981531
265,	Dec. 31, Log. Dist.	*for* 9.8419039	*read* 9.841904
308,	*β* Ursæ Minoris	*for* —0.2096	*read* —0.2086
419,	Dec. 32, App. Decl.	*for* 23.1	*read* 23.5
425,	Dec. 31, App. R. A.	*for* 33.95	*read* 33.94
425,	Dec. 32, App. R. A.	*for* 42.70	*read* 42.65
441,	Oct. 11, Perigee	*for* 3.5	*read* 13.5

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INTRODUCTION.

The Ephemeris for the Meridian of Greenwich, comprising Part I of this volume, has been constructed from various tables of the Sun, Moon, and planets, as stated below, and the ephemerides of these bodies for the meridian of Washington contained in Part II have been computed from the same tables.

The Ephemeris of the Sun is constructed from Professor NEWCOMB'S *Tables of the Sun*, *Astronomical Papers of the American Ephemeris*, Vol. VI, part 1.

The adopted value of the mean equatorial horizontal parallax of the Sun is $8''.80$, *Paris Conference, May, 1896.*

The Sun's rectangular equatorial coordinates are computed from the longitudes and latitudes by the following formulæ:

$$\begin{aligned} X &= R \cos \lambda \\ Y &= R \sin \lambda \cos \omega - 19.3\, R\, \beta \\ Z &= R \sin \lambda \sin \omega + 44.5\, R\, \beta \end{aligned}$$

The reductions to mean equinox are computed by the formulæ—

$$\begin{aligned} \Delta X &= +\, Y \sec \omega\, \Delta\lambda \sin 1'' \\ \Delta Y &= -\, X \cos \omega\, \Delta\lambda \sin 1'' + Z \Delta\omega \sin 1'' + 9.1\, \tau\, R \sin (\lambda + 6^\circ) \\ \Delta Z &= -\, X \sin \omega\, \Delta\lambda \sin 1'' - Y \Delta\omega \sin 1'' - 21.0\, \tau\, R \sin (\lambda + 6^\circ) \end{aligned}$$

where the numerical coefficients are in units of the seventh place of decimals and

R = the Sun's radius vector;
λ = the Sun's true longitude;
β = the Sun's true latitude, expressed in seconds of arc;
ω = the obliquity of the ecliptic;
$\Delta\lambda$ = the reduction of longitude for precession and nutation from the beginning of the Besselian fictitious year;
$\Delta\omega$ = the reduction of the mean to the apparent obliquity;
τ = the fraction of the year since the beginning of the Besselian fictitious year.

The longitude, latitude, and parallax of the moon are derived from HANSEN'S "*Tables de la Lune*" (London, 1857), the mean longitude being corrected as in previous years, beginning with the volume for the year 1883. The statement concerning these corrections which is contained in the volumes from 1883 to 1911 inclusive, is erroneous, in that they have not been computed strictly in accordance with the formulæ in NEWCOMB'S *Researches on the Motion of the Moon*, part 1, page 268. The expression actually used for these corrections is as follows:

$$-1''.14 - 0''.2917\,(t-1800) - 0''.0376\,(t-1800)^2 - V_2 - 15''.49 \cos A$$

which is the same as the formula referred to, except that the term $-0''.09 \sin A$ has been omitted, and the constant $3''.86$ has been replaced by $3''.76$.

The ephemerides of Mercury, Venus, and Mars are derived from Professor NEWCOMB's tables of these planets, *Astronomical Papers of the American Ephemeris*, Vol. VI, parts 2, 3, and 4.

The ephemerides of Jupiter and Saturn are derived from the tables constructed in this office by Dr. GEORGE W. HILL, *Astronomical Papers of the American Ephemeris*, Vol. VII, parts 1 and 2.

The ephemerides of Uranus and Neptune are derived from Professor NEWCOMB's tables of these planets, *Astronomical Papers of the American Ephemeris*, Vol. VII, parts 3 and 4.

The nutation used in computing the ephemerides of the Sun, Moon, and planets has been taken from Tables XXXII and XXXIII of NEWCOMB's Tables of the Sun, *Astronomical Papers of the American Ephemeris*, Vol. VI, part 1, and is given at intervals of five days on page 214. The formulæ from which the nutation is computed are as follows, the time interval T being expressed in units of 100 years, reckoned from 1900. See *Tables of the Sun*, page 26.

$$\begin{aligned} \delta\psi = &-(17''.234 + 0''.017\,T)\sin\Omega \\ &+ 0''.209 \sin 2\,\Omega \\ &- 1''.257 \sin 2\,L \\ &- 0''.049 \sin (3\,L + 78^\circ.7) \\ &+ 0''.110 \sin (L + 75^\circ.3) \end{aligned} \qquad \begin{aligned} \delta\varepsilon = &+9''.214 \cos\Omega \\ &-0''.090 \cos 2\,\Omega \\ &+0''.546 \cos 2\,L \\ &+0''.021 \cos (3\,L + 78^\circ.7) \\ &-0''.009 \cos (L - 78^\circ.7) \end{aligned}$$

These formulæ for the nutation are practically the same as those used in the reduction to apparent place of the 10-day stars, pages 287 to 486.

The list of 825 stars contained in Part II has been selected from NEWCOMB's Catalogue of Fundamental Stars, *Astronomical Papers of the American Ephemeris*, Vol. VIII, part 2. The mean places and annual variations of the stars have been taken from NEWCOMB's Catalogue, except that those of ε Hydri, 38 Horologii (*G*), and π Centauri have been taken from "*Veroeffentlichungen des Koeniglichen Astronomischen Rechen-Instituts zu Berlin, No. 33.*"

The relative accuracy with which the places of the stars are determined in both right ascension and declination, may be estimated approximately from the mean errors for the year 1920, given on pages 511–517, and taken from *Astronomical Papers of the American Ephemeris*, Vol. VIII, part 2, pages 370–382.

The constants of precession, nutation, aberration, and obliquity of the ecliptic, used in the reduction of stars to apparent place, are given on page 214, and the formulæ for the computation of the Besselian and Independent Star Numbers are given on page 216, the coefficients being those given by Professor Newcomb in *Bulletin Astronomique*, Tome XV, page 241.

The terms of short period of the nutation depending on the Moon's mean longitude are tabulated for Washington mean midnight of each day on pages 231–232, and have been taken from Tables XXXIV to XXXVII of NEWCOMB's *Tables of the Sun* mentioned above, which tables are computed from formulæ given on page 27 of the same work.

The method by which the right ascensions and declinations of the stars interpolated from the 10-day ephemerides (pp. 287–486) are corrected for the effect of these short-period terms is given on page 217.

According to the formulæ on pages 216 and 217 the star constants a, b, c, d, a', b', c', d' are computed for each star from its mean place at the beginning of the year, but if strict accuracy is required they should be computed from the star's mean place at date, and the following second order terms should be added to the usual expressions for the reduction from mean to apparent place, namely—

To $\alpha-\alpha_0$

$$\begin{array}{l}
\text{s} \\
\left.\begin{array}{l} +0.000\,003\;\tau^2\sin\alpha \\ -0.000\,149\;\tau^2\cos\alpha \end{array}\right\}\tan\delta \\
\left.\begin{array}{l} -0.000\,0650\;\tau^2\sin 2\alpha \\ +0.000\,0103\sin 2\,\Omega\,\cos 2\alpha \\ -0.000\,0107\cos 2\,\Omega\,\sin 2\alpha \end{array}\right\}\tan^2\delta \\
\left.\begin{array}{l} +0.000\,0620\sin 2\,\odot\,\cos 2\alpha \\ -0.000\,0622\cos 2\,\odot\,\sin 2\alpha \end{array}\right\}\sec^2\delta \\
\left.\begin{array}{l} +0.000\,0513\sin(\odot+\Omega)\cos 2\alpha \\ -0.000\,0507\cos(\odot+\Omega)\sin 2\alpha \\ +0.000\,0097\sin(\odot-\Omega)\cos 2\alpha \\ -0.000\,0053\cos(\odot-\Omega)\sin 2\alpha \end{array}\right\}\tan\delta\sec\delta
\end{array}$$

To $\delta-\delta_0$

$$\begin{array}{l}
'' \\
\left.\begin{array}{l} +0.000\,975\;\tau^2\sin^2\alpha \\ -0.000\,023\cos 2\,\Omega \\ -0.000\,080\cos 2\,\Omega\cos 2\alpha \\ -0.000\,077\sin 2\,\Omega\sin 2\alpha \\ +0.000\,040\cos 2\,\odot \\ -0.000\,467\cos 2\,\odot\cos 2\alpha \\ -0.000\,465\sin 2\,\odot\sin 2\alpha \end{array}\right\}\tan\delta \\
\left.\begin{array}{l} -0.000\,039\cos(\odot+\Omega) \\ -0.000\,380\cos(\odot+\Omega)\cos 2\alpha \\ -0.000\,385\sin(\odot+\Omega)\sin 2\alpha \\ -0.000\,380\cos(\odot-\Omega) \\ -0.000\,040\cos(\odot-\Omega)\cos 2\alpha \\ -0.000\,072\sin(\odot-\Omega)\sin 2\alpha \end{array}\right\}\sin\delta\tan\delta
\end{array}$$

These terms are negligible for stars whose declination is numerically less than 80°, but in computing the apparent places given in the American Ephemeris they have been applied whenever sensible.

The *apparent* places of α Canis Majoris (Sirius), α Canis Minoris (Procyon), α^2 Centauri and 61 Cygni have been corrected for the effect of annual parallax, the adopted constants of parallax being 0".38, 0".27, 0".75, and 0".40, respectively.

The *apparent* places of α Canis Majoris (Sirius), α Canis Minoris (Procyon), and α^2 Centauri have been corrected for the effect of orbital motion, as tabulated on pages 98 and 99 of "*Veroeffentlichungen des Koeniglichen Astronomischen Rechen-Instituts zu Berlin, No. 33.*" AUWERS's elements were used for Sirius and Procyon, and SEE's elements for α^2 Centauri. The values of these corrections are—

	Sirius.		Procyon.		α^2 Centauri.	
	1912.0	1913.0	1912.0	1913.0	1912.0	1913.0
$\Delta\alpha$	$-0^s.218$	$-0^s.223$	$-0^s.042$	$-0^s.048$	$+0^s.693$	$+0^s.686$
$\Delta\delta$	$-0''.38$	$-0''.52$	$-0''.66$	$-0''.57$	$+7''.22$	$+7''.00$

[In former issues of the *American Ephemeris*, values differing from the above, were used for Sirius and Procyon, and no correction was applied to α^2 Centauri.] The *mean* places of these three stars as printed are those derived from NEWCOMB's Fundamental Catalogue, without correction, being in each case the position of the center of gravity of the system.

The values of $\Delta\alpha$ and $\Delta\delta$ which are given for the companions to the stars γ Andromedæ, ζ Ursæ Majoris and 61 Cygni have been taken from the Greenwich 10-year catalogue for 1890, those for α Crucis from the Cape Catalogue for 1900, and those for α Geminorum from DOBERCK's elements in the *Astronomische Nachrichten* No. 3970.

The magnitudes of the stars have, with a few exceptions, been taken from *Annals of the Harvard College Observatory*, Vol. L.

In general, the names of the stars are the same as in NEWCOMB's Suggested List of Fundamental Stars, except that the Flamsteed number has been omitted in all cases where Greek or italic letters are available. In some cases the constellation and number of the uranometries of Heis or Gould have been used. In all such cases, Heis or the letter G in parentheses, follows the constellation name, as, for example, 5 Cassiopeiæ (Heis) and 38 Horologii (G).

The stars occulted by the Moon, pages 567–570, have been selected from the catalogue of zodiacal stars contained in Vol. VIII, Part 3, *Astronomical Papers of the American Ephemeris*, and the mean places for 1912.0 have been derived from the same catalogue.

In Part III the elements of eclipses of the Sun and occultations of stars by the Moon are given in accordance with BESSEL'S method, the special forms employed being a modification of those developed in CHAUVENET'S *Spherical and Practical Astronomy*.

In the computation of the elements of Eclipses of the Sun, the following corrections to the longitude, latitude, and parallax of the Moon, deduced by the late Prof. SIMON NEWCOMB from recent observations of occultations of stars by the Moon, have been applied. These corrections have been assumed in each case to be constant during the eclipse.

G. M. T.	δv	δb	$\delta \pi$
1912	$''$	$''$	$''$
April 17^d 0^h	+9.8	+1.7	+0.4
Oct. 10 2	+7.8	+0.4	+0.4

The satellites of Mars are computed from manuscript tables based upon elements deduced by Prof. WALTER S. HARSHMAN.

The eclipses of Jupiter's satellites are computed from a *Continuation of* DAMOISEAU'S *Tables*. The occultations, transits, etc., are computed from WOOLHOUSE'S tables, published in the *British Nautical Almanac* for 1835; Table II of each satellite having been adapted to DAMOISEAU'S tables.

The Vth. satellite of Jupiter is computed from manuscript tables based upon unpublished elements deduced from the observations of Prof. E. E. BARNARD.

The differential coordinates of Jupiter's VIth. and VIIth. satellites have been computed from elements and tables published in *Lick Observatory Bulletin* No. 112 and in *Astronomische Nachrichten*, Vol. 174, p. 359, respectively.

The elongations and conjunctions of the satellites and the positions of the rings of Saturn are computed from manuscript tables based on Prof. H. STRUVE'S elements as published in *Beobachtungen der Saturnstrabanten*, St. Petersburg, 1898. The differential coordinates of Phœbe have been computed from elements and tables printed in the *Annals of Harvard College Observatory*, Vol. LIII, No. VI.

The apparent dimensions of the rings of Saturn are computed from BESSEL'S data, except those for the dusky ring, which are based on the observations of various astronomers.

The elongations of the satellites of Uranus are computed from the data of Professor NEWCOMB'S *Uranian and Neptunian Systems, Washington Observations*, 1873, Appendix I.

The elongations of the satellite of Neptune are computed from manuscript tables based upon the late Prof. A. HALL'S elements published in the *Astronomical Journal*, 1898, Vol. XIX, p. 65.

The adopted apparent semidiameter of the Sun at the Earth's mean distance is $16' \; 1''.50$; while in the computation of eclipses, the value given by AUWERS in the *Astronomische Nachrichten*, 1891, Bd. 128, S. 367, is employed, viz, $15' \; 59''.63$.

The apparent semidiameter of the Moon is computed from the Moon's equatorial horizontal parallax, π, by the formula,

$$S = 0.272\,506\;\pi + 1''.50$$

where the constant 0.272 506 is based on data from occultations given by Mr. J. PETERS in the *Astronomische Nachrichten*, 1895, Bd. 138, S. 147; and the constant $1''.50$ is added to cover the average effect of irradiation.

The value of the Moon's semidiameter employed in the computation of eclipses is computed from the formula,

$$S = 0.272\,274\;\pi$$

the constant being the one used in this Ephemeris prior to 1902.

The adopted semidiameters of the planets are given on page XIII and the parallaxes of the Sun and Moon on page XII.

The stellar magnitudes of the planets given on pages 607–609 have been computed from formulæ given by Dr. G. MUELLER in the Potsdam Observations, vol. 8, p. 366.

In the list of observatories, pages 650–659, the latitudes given are in most cases astronomical. In some instances they have been determined by geodetic triangulation from other points. The reductions from geographic to geocentric latitude, $\varphi' - \varphi$, and the distance from the center of the earth, ρ, are computed from the formulæ for CLARKE's Spheroid of 1866 as given on page XII.

ASTRONOMICAL CONSTANTS.

	″	
Solar Parallax	8.80	Paris Conference.
Constant of Nutation	9.21	
Constant of Aberration	20.47	

General Precession	$50''.2564+0''.000\,222(t-1900)$	Newcomb.
Obliquity of the Ecliptic	$23^\circ\,27'\,8''.26-0''.4684(t-1900)$	

Equatorial Horizontal Parallax of the Moon . . . . $57'\,2''.68$* (Newcomb).

Mean distance Earth to Moon 384 395 kilometers = 238 851 miles, or 60.2669 radii.

Mean distance Earth to Sun 149 499 935 kilometers = 92 894 767 statute miles.

Velocity of light 299 860 kilometers = 186 324 statute miles per second (Newcomb and Michelson).

Light travels unit distance in $498^{s}.566$.

Gaussian Gravitation Constant, † $k=0.017\,202\,099=3\,548''.187\,61$.

Acceleration in one sec. due to gravity,	$g=\overset{m}{9}.8060-\overset{m}{0}.0260\cos 2\varphi-\frac{2h}{R}g$.‡	Helmert.
Length of seconds pendulum,	$l=\overset{m}{0}.993\,549-\overset{m}{0}.002\,631\cos 2\varphi-\frac{2h}{R}l$.‡	

Length of the year:

	d	
Tropical (ordinary)	$365.242\,198\,79-0.000\,000\,0614\,(t-1900)$	Newcomb.
Sidereal	$365.256\,360\,42+0.000\,000\,0011\,(t-1900)$	
Anomalistic	$365.259\,641\,34+0.000\,000\,0304\,(t-1900)$	

Length of the month:

	d	h	m	s	
Synodical (ordinary)	29	12	44	2.8	Hansen.
Tropical	27	7	43	4.7	
Sidereal	27	7	43	11.5	
Anomalistic	27	13	18	33.1	

Length of the day:

	h	m	s	
Sidereal	23	56	4.091	of mean solar time.
Mean Solar	24	3	56.555	of sidereal time.

Dimensions of the Earth (Clarke's Spheroid of 1866).

Equatorial Radius, $a=6378.206$ kilometers or 3963.23 statute miles.

Polar Radius, $b=6356.584$ " or 3949.79 " "

Flattening, $\frac{a-b}{a}=\frac{1}{295.0}$

Logarithm of the eccentricity $\frac{\sqrt{a^2-b^2}}{a}=\log e=8.915\,251\,28$

Logarithm radius $=\log\rho=9.999\,2645+0.000\,7374\cos 2\varphi-0.000\,0019\cos 4\varphi$.

Reduction from geographic latitude φ to geocentric latitude φ',

$$\varphi'-\varphi=-11'\,40''.44\sin 2\varphi+1''.19\sin 4\varphi.$$

1 meter = 3.280 8333 feet. 1 foot = 0.304 8006 meters.

1 statute mile = 0.868 392 nautical or geographical miles.

1 nautical mile = 1.151 553 statute miles.

---

* The parallax used in the computation of the ephemeris of the Moon contained in this volume is $57'\,2''.23$ (Hansen).

† k^2 is the acceleration due to the Sun's attraction at the mean distance of the Earth from the Sun, which is also the astronomical unit of distance, the unit of time being one mean solar day.

‡ φ = latitude, h = elevation above sea level in meters, and $\log R=6.80416$.

ASTRONOMICAL CONSTANTS.

SEMIDIAMETERS OF THE SUN, MOON, AND PLANETS.

Name.	At unit Distance.	At mean least Distance.	In Kilometers.	In Statute Miles.	Authority.
	′ ″	″			
Sun	15 59.63	. .	695 533.61	432 183.68	Auwers.
Moon	15 31.91*	. .	1 736.69	1 079.13	Newcomb.
Mercury	3.34	5.45	2 420.82	1 504.24	Le Verrier.
Venus	8.55	30.90	6 197.01	3 850.67	Peirce.
Mars	5.05	9.64	3 660.22	2 274.37	Peirce.
Jupiter (Equatorial) . .	1 40.20	23.84	72 624.56	45 127.16	Am. Eph.
Jupiter (Polar)	1 34.12	22.40	68 217.80	42 388.90	Peirce.
Saturn (Equatorial) . .	1 24.88	9.94	61 520.69	38 227.48	Barnard.
Saturn (Polar)	1 17.47	9.07	56 149.95	34 890.23	Barnard.
Uranus	33.52	1.84	24 295.16	15 096.43	Am. Eph.
Neptune	38.66	1.33	28 020.61	17 411.34	Am. Eph.

ELEMENTS OF THE PLANETARY ORBITS FOR THE EPOCH 1912—January 0^d G. M. T.

Name.	Mean Longitude at the Epoch.	Mean Longitude of the Perihelion.	Mean Longitude of the Node.	Inclination to the Ecliptic.
	° ′ ″	° ′ ″	° ′ ″	° ′ ″
☿ Mercury	115 4 3.26	76 5 10.9	47 17 17.4	7 0 11.2
♀ Venus	165 4 20.94	130 19 58.0	75 53 15.5	3 23 37.5
⊕ Earth	99 47 20.22	101 25 37.7	. . .	. . .
♂ Mars	70 45 5.47	334 26 21.8	48 52 42.6	1 51 1.0
♃ Jupiter	242 24 21.96	12 54 18.0	99 33 33.3	1 18 29.1
♄ Saturn	53 23 10.90	91 19 26.1	112 53 17.7	2 29 30.6
♅ Uranus	294 57 2.33	169 14 25.8	73 33 2.1	0 46 21.9
♆ Neptune	111 24 32.14	43 51 38.2	130 48 38.9	1 46 41.2

Name.	Eccentricity.	Mean Distance.	Logarithm of the mean Distance.	Mean daily Motion.	Logarithm of Mass in unit of Sun's Mass.
				″	
☿ Mercury . . .	0.205 6167	0.387 099	9.587 8216	14 732.420	3.221 8487—10
♀ Venus . . .	0.006 8150	0.723 331	9.859 3374	5 767.670	4.389 3398—10
⊕ Earth	0.016 7460	1.000 000	0.000 0001	3 548.193	4.482 2896—10
♂ Mars	0.093 3198	1.523 688	0.182 8962	1 886.519	3.509 5499—10
♃ Jupiter . . .	0.048 3570	5.202 803	0.716 2374	299.128	6.979 9082—10
♄ Saturn . . .	0.055 8482	9.538 843	0.979 4957	120.455	6.455 7335—10
♅ Uranus . . .	0.047 0781	19.190 978	1.283 0971	42.23	5.640 7528—10
♆ Neptune . . .	0.008 5410	30.070 672	1.478 1431	21.53	5.705 5338—10

The elements of the four inner planets are derived from those given by Newcomb in Vol. VI of the Astronomical Papers of the American Ephemeris, and are the same as those used in computing the ephemerides of these planets. Those of Jupiter, Saturn, Uranus, and Neptune are taken from Vol. VII of the Astronomical Papers for the epoch of the tables. They are reduced to 1912 by applying Le Verrier's variations, and can not be regarded as being strictly identical with the elements used in computing the ephemerides of those planets in this volume.

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*At mean distance.

ANNIVERSARIES AND FESTIVALS, 1912.

New Year's Day	Jan. 1
Epiphany	Jan. 6
Septuagesima Sunday	Feb. 4
Lincoln's Birthday	Feb. 12
Quinquagesima (Shrove Sunday)	Feb. 18
Ash Wednesday	Feb. 21
Washington's Birthday	Feb. 22
Palm Sunday	Mar. 31
First Day of Passover	Apr. 2
Good Friday	Apr. 5
Easter Sunday	Apr. 7
Rogation Sunday	May 12
Ascension Day (Holy Thursday)	May 16
Hebrew Pentecost (Shebuoth)	May 22
Pentecost (Whit Sunday)	May 26
Memorial Day	May 30
Trinity Sunday	June 2
Corpus Christi	June 6
Independence Day	July 4
Labor Day (except in certain States)	Sept. 2
Day of Atonement (Yom Kippur)	Sept. 21
First Day of Tabernacle (Sucoth)	Sept. 26
General Election Day (except in certain States)	Nov. 5
Thanksgiving Day	Nov. 28
First Sunday in Advent	Dec. 1
Christmas Day	Dec. 25

CHRONOLOGICAL ERAS AND CYCLES.

CHRONOLOGICAL ERAS.

THE YEAR 1912, WHICH COMPRISES THE LATTER PART OF THE 136TH AND THE BEGINNING OF THE 137TH YEAR OF THE INDEPENDENCE OF THE UNITED STATES OF AMERICA, CORRESPONDS TO—

The year 6625 of the Julian Period;

" 7420–7421 of the Byzantine era, the year 7421 commencing on September 1;

" 5672–5673 of the Jewish era, the year 5671 commencing on September 12, or, more exactly, at sunset on September 11;

" 2665 since the foundation of Rome, according to VARRO;

" 2659 since the beginning of the era of NABONASSAR, which has been assigned to Wednesday, the 26th of February of the 3967th year of the Julian Period; corresponding, in the notation of chronologists, to the 747th, and, in the notation of astronomers, to the 746th year before the birth of CHRIST;

" 2688 of the Olympiads, or the second year of the 672d Olympiad, commencing in July, 1912, if we fix the era of the Olympiads at 775½ years before CHRIST, or near the beginning of July of the year 3938 of the Julian Period;

" 2224 of the Grecian era, or the era of the SELEUCIDÆ, which began near the vernal equinox of the year, − 311 = B. C. 312, = 4402 of the Julian Period;

" 1628 of the era of DIOCLETIAN;

" 2572 of the Japanese era and to the 43d year of the period entitled "Meiji."

The year 1331 of the Mohammedan era, or the era of the Hegira, begins on the 11th day of December, 1912.

The first day of January of the year 1912 is the 2,419,403d day since the commencement of the Julian Period.

CHRONOLOGICAL CYCLES.

Dominical Letter	GF	Solar Cycle	17
Epact	11	Roman Indiction	10
Lunar Cycle or Golden Number	13	Julian Period	6625

SYMBOLS AND ABBREVIATIONS.

SIGNS OF THE PLANETS, ETC.

☉	The Sun.	♂	Mars.
☾	The Moon.	♃	Jupiter.
☿	Mercury.	♄	Saturn.
♀	Venus.	⛢	Uranus.
⊕	The Earth.	♆	Neptune.

SIGNS OF THE ZODIAC.

Spring Signs.	1.	♈	Aries.	Autumn Signs.	7.	♎	Libra.
	2.	♉	Taurus.		8.	♏	Scorpius.
	3.	♊	Gemini.		9.	♐	Sagittarius.
Summer Signs.	4.	♋	Cancer.	Winter Signs.	10.	♑	Capricornus.
	5.	♌	Leo.		11.	♒	Aquarius.
	6.	♍	Virgo.		12.	♓	Pisces.

ASPECTS.

☌	Conjunction, or having the same Longitude or Right Ascension.
□	Quadrature, or differing ±90° in Longitude or Right Ascension.
☍	Opposition, or differing 180° in Longitude or Right Ascension.

ABBREVIATIONS.

☊	Ascending Node.	°	Degrees.
☋	Descending Node.	′	Minutes of Arc.
N.	North.	″	Seconds of Arc.
S.	South.	h	Hours.
E.	East.	m	Minutes of Time.
W.	West.	s	Seconds of Time.

PART I.

ASTRONOMICAL EPHEMERIS FOR THE MERIDIAN OF GREENWICH.

JANUARY, 1912.

AT GREENWICH APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S					Sidereal Time of Semidiameter Passing Meridian.	Equation of Time, to be Added to Apparent Time.	Diff. for 1 Hour.
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.	Semidiameter.			
		h m s	s	° ′ ″	″	′ ″	s	m s	s
Mon.	1	18 42 21.37	11.053	S. 23 5 43.7	+11.19	16 17.89	71.09	3 13.30	1.193
Tues.	2	18 46 46.49	11.039	23 1 1.5	12.34	16 17.90	71.04	3 41.79	1.179
Wed.	3	18 51 11.26	11.025	22 55 51.6	13.49	16 17.90	71.00	4 9.93	1.165
Thur.	4	18 55 35.68	11.009	22 50 14.4	+14.63	16 17.91	70.95	4 37.71	1.149
Frid.	5	18 59 59.71	10.992	22 44 10.0	15.75	16 17.91	70.90	5 5.11	1.133
Sat.	6	19 4 23.33	10.975	22 37 38.5	16.87	16 17.90	70.84	5 32.11	1.115
SUN.	7	19 8 46.53	10.957	22 30 40.3	+17.98	16 17.87	70.78	5 58.67	1.097
Mon.	8	19 13 9.28	10.939	22 23 15.3	19.09	16 17.84	70.71	6 24.78	1.077
Tues.	9	19 17 31.55	10.919	22 15 23.9	20.19	16 17.80	70.64	6 50.41	1.057
Wed.	10	19 21 53.31	10.896	22 7 6.3	+21.28	16 17.76	70.57	7 15.54	1.036
Thur.	11	19 26 14.54	10.873	21 58 22.7	22.36	16 17.72	70.50	7 40.15	1.014
Frid.	12	19 30 35.23	10.850	21 49 13.3	23.43	16 17.67	70.42	8 4.21	0.990
Sat.	13	19 34 55.33	10.826	21 39 38.4	+24.49	16 17.61	70.34	8 27.70	0.966
SUN.	14	19 39 14.83	10.800	21 29 38.3	25.53	16 17.55	70.26	8 50.59	0.941
Mon.	15	19 43 33.71	10.773	21 19 13.1	26.57	16 17.48	70.17	9 12.86	0.914
Tues.	16	19 47 51.96	10.746	21 8 23.3	+27.59	16 17.41	70.08	9 34.48	0.887
Wed.	17	19 52 9.54	10.717	20 57 9.2	28.59	16 17.34	69.98	9 55.42	0.859
Thur.	18	19 56 26.42	10.688	20 45 31.0	29.58	16 17.26	69.88	10 15.68	0.830
Frid.	19	20 0 42.58	10.658	20 33 29.1	+30.56	16 17.18	69.78	10 35.24	0.800
Sat.	20	20 4 58.02	10.628	20 21 3.9	31.53	16 17.10	69.68	10 54.08	0.769
SUN.	21	20 9 12.71	10.597	20 8 15.7	32.48	16 17.01	69.57	11 12.17	0.738
Mon.	22	20 13 26.64	10.565	19 55 4.8	+33.41	16 16.92	69.47	11 29.49	0.706
Tues.	23	20 17 39.80	10.533	19 41 31.7	34.33	16 16.82	69.36	11 46.04	0.673
Wed.	24	20 21 52.16	10.500	19 27 36.7	35.24	16 16.72	69.26	12 1.80	0.640
Thur.	25	20 26 3.72	10.465	19 13 20.0	+36.13	16 16.62	69.15	12 16.76	0.607
Frid.	26	20 30 14.46	10.430	18 58 42.3	37.01	16 16.52	69.04	12 30.91	0.573
Sat.	27	20 34 24.38	10.396	18 43 43.9	37.86	16 16.41	68.93	12 44.24	0.538
SUN.	28	20 38 33.48	10.361	18 28 25.0	+38.70	16 16.29	68.82	12 56.74	0.504
Mon.	29	20 42 41.74	10.326	18 12 46.2	39.52	16 16.16	68.71	13 8.41	0.469
Tues.	30	20 46 49.16	10.291	17 56 48.0	40.32	16 16.03	68.60	13 19.25	0.434
Wed.	31	20 50 55.74	10.256	17 40 30.7	41.11	16 15.90	68.48	13 29.25	0.400
Thur.	32	20 55 1.49	10.222	S. 17 23 54.5	+41.89	16 15.76	68.37	13 38.41	0.365

Note.—The mean time of semidiameter passing may be found by subtracting $0^s.19$ from the sidereal time.
The sign + prefixed to the hourly change of declination indicates that south declinations are decreasing.

AT GREENWICH MEAN NOON.

Day of the Week.	Day of the Month.	THE SUN'S				Equation of Time, to be Subtracted from Mean Time.	Diff. for 1 Hour.	Sidereal Time, or Right Ascension of Mean Sun.
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.			
		h m s	s	° ′ ″	″	m s	s	h m s
Mon.	1	18 42 20.78	11.049	S. 23 5 44.3	+11.18	3 13.24	1.193	18 39 7.54
Tues.	2	18 46 45.81	11.035	23 1 2.2	12.33	3 41.72	1.179	18 43 4.10
Wed.	3	18 51 10.50	11.021	22 55 52.5	13.47	4 9.85	1.165	18 47 0.66
Thur.	4	18 55 34.84	11.006	22 50 15.5	+14.61	4 37.62	1.149	18 50 57.22
Frid.	5	18 59 58.79	10.990	22 44 11.3	15.74	5 5.01	1.133	18 54 53.78
Sat.	6	19 4 22.33	10.972	22 37 40.1	16.86	5 32.00	1.115	18 58 50.33
SUN.	7	19 8 45.45	10.953	22 30 42.0	+17.97	5 58.56	1.097	19 2 46.89
Mon.	8	19 13 8.12	10.934	22 23 17.3	19.08	6 24.66	1.077	19 6 43.45
Tues.	9	19 17 30.30	10.914	22 15 26.2	20.17	6 50.29	1.057	19 10 40.01
Wed.	10	19 21 51.99	10.893	22 7 8.8	+21.26	7 15.42	1.036	19 14 36.57
Thur.	11	19 26 13.15	10.870	21 58 25.5	22.34	7 40.02	1.014	19 18 33.13
Frid.	12	19 30 33.77	10.847	21 49 16.4	23.41	8 4.08	0.990	19 22 29.68
Sat.	13	19 34 53.81	10.822	21 39 41.8	+24.47	8 27.57	0.966	19 26 26.24
SUN.	14	19 39 13.25	10.797	21 29 42.0	25.51	8 50.45	0.940	19 30 22.80
Mon.	15	19 43 32.07	10.770	21 19 17.2	26.55	9 12.71	0.914	19 34 19.36
Tues.	16	19 47 50.25	10.743	21 8 27.7	+27.57	9 34.33	0.887	19 38 15.92
Wed.	17	19 52 7.76	10.715	20 57 13.9	28.58	9 55.28	0.859	19 42 12.48
Thur.	18	19 56 24.58	10.686	20 45 36.1	29.57	10 15.54	0.830	19 46 9.03
Frid.	19	20 0 40.70	10.656	20 33 34.6	+30.55	10 35.10	0.800	19 50 5.59
Sat.	20	20 4 56.09	10.626	20 21 9.7	31.52	10 53.94	0.769	19 54 2.15
SUN.	21	20 9 10.73	10.595	20 8 21.8	32.47	11 12.03	0.738	19 57 58.71
Mon.	22	20 13 24.62	10.563	19 55 11.2	+33.40	11 29.36	0.706	20 1 55.27
Tues.	23	20 17 37.74	10.530	19 41 38.4	34.32	11 45.91	0.673	20 5 51.82
Wed.	24	20 21 50.06	10.497	19 27 43.7	35.23	12 1.68	0.640	20 9 48.38
Thur.	25	20 26 1.58	10.463	19 13 27.4	+36.12	12 16.65	0.607	20 13 44.94
Frid.	26	20 30 12.29	10.429	18 58 50.0	37.00	12 30.80	0.573	20 17 41.50
Sat.	27	20 34 22.18	10.395	18 43 51.9	37.85	12 44.13	0.538	20 21 38.05
SUN.	28	20 38 31.25	10.360	18 28 33.4	+38.69	12 56.64	0.504	20 25 34.61
Mon.	29	20 42 39.48	10.326	18 12 55.0	39.51	13 8.31	0.469	20 29 31.17
Tues.	30	20 46 46.87	10.291	17 56 57.0	40.31	13 19.15	0.434	20 33 27.72
Wed.	31	20 50 53.44	10.256	17 40 39.9	41.10	13 29.16	0.400	20 37 24.28
Thur.	32	20 54 59.17	10.221	S. 17 24 4.0	+41.88	13 38.33	0.365	20 41 20.84

NOTE.—The semidiameter for mean noon may be assumed the same as that for apparent noon. The sign + prefixed to the hourly change of declination indicates that south declinations are decreasing.

Diff. for 1 Hour, $+9^{s}.8565$. (Table III.)

AT GREENWICH MEAN NOON.

Day of the Month.	Day of the Year.	THE SUN'S				Logarithm of the Radius Vector of the Earth.	Diff. for 1 Hour.	Mean Time of Sidereal Noon.
		True Longitude.		Diff. for 1 Hour.	Latitude.			
		λ	λ′					
		° ′ ″	′ ″	″	″			h m s
1	1	279 44 7.0	44 14.3	152.86	+0.61	9.992 6508	− 2.3	5 19 59.90
2	2	280 45 15.6	45 22.7	152.86	0.71	9.992 6467	− 1.1	5 16 3.98
3	3	281 46 24.2	46 31.0	152.85	0.78	9.992 6454	+ 0.1	5 12 8.07
4	4	282 47 32.6	47 39.2	152.85	+0.83	9.992 6470	+ 1.3	5 8 12.15
5	5	283 48 40.9	48 47.4	152.85	0.84	9.992 6516	2.6	5 4 16.24
6	6	284 49 49.3	49 55.6	152.85	0.82	9.992 6592	3.8	5 0 20.33
7	7	285 50 57.6	51 3.8	152.85	+0.77	9.992 6696	+ 4.9	4 56 24.42
8	8	286 52 6.1	52 12.0	152.85	0.69	9.992 6828	6.0	4 52 28.50
9	9	287 53 14.5	53 20.3	152.85	0.59	9.992 6987	7.1	4 48 32.59
10	10	288 54 23.0	54 28.6	152.85	+0.47	9.992 7171	+ 8.1	4 44 36.68
11	11	289 55 31.5	55 36.9	152.85	0.34	9.992 7378	9.1	4 40 40.76
12	12	290 56 40.0	56 45.2	152.85	0.21	9.992 7607	10.0	4 36 44.85
13	13	291 57 48.4	57 53.4	152.85	+0.08	9.992 7857	+10.8	4 32 48.94
14	14	292 58 56.7	59 1.5	152.84	−0.04	9.992 8127	11.7	4 28 53.03
15	15	294 0 4.7	0 9.3	152.83	0.15	9.992 8416	12.5	4 24 57.12
16	16	295 1 12.4	1 16.9	152.82	−0.24	9.992 8722	+13.2	4 21 1.20
17	17	296 2 19.8	2 24.1	152.80	0.30	9.992 9046	13.9	4 17 5.29
18	18	297 3 26.7	3 30.8	152.78	0.34	9.992 9387	14.6	4 13 9.38
19	19	298 4 33.1	4 37.0	152.75	−0.35	9.992 9745	+15.2	4 9 13.47
20	20	299 5 38.9	5 42.6	152.72	0.33	9.993 0119	15.9	4 5 17.55
21	21	300 6 44.0	6 47.5	152.69	0.29	9.993 0509	16.6	4 1 21.64
22	22	301 7 48.2	7 51.6	152.66	−0.23	9.993 0915	+17.3	3 57 25.73
23	23	302 8 51.6	8 54.8	152.62	0.15	9.993 1338	18.0	3 53 29.82
24	24	303 9 54.0	9 57.0	152.58	−0.04	9.993 1778	18.7	3 49 33.91
25	25	304 10 55.4	10 58.2	152.54	+0.07	9.993 2235	+19.4	3 45 38.00
26	26	305 11 55.7	11 58.3	152.49	0.19	9.993 2710	20.2	3 41 42.08
27	27	306 12 54.8	12 57.3	152.44	0.32	9.993 3205	21.0	3 37 46.17
28	28	307 13 52.8	13 55.1	152.39	+0.44	9.993 3721	+21.9	3 33 50.26
29	29	308 14 49.5	14 51.6	152.34	0.54	9.993 4259	22.9	3 29 54.35
30	30	309 15 44.9	15 46.9	152.29	0.63	9.993 4820	23.9	3 25 58.44
31	31	310 16 39.0	16 40.9	152.23	0.67	9.993 5405	24.9	3 22 2.53
32	32	311 17 31.9	17 33.6	152.18	+0.67	9.993 6015	+26.0	3 18 6.62

NOTE.—The longitudes in the column λ are referred to the true equinox of their own date, while those in the column λ′ are referred to the mean equinox of the beginning of the Besselian fictitious year.

Diff. for 1 Hour, $-9^s.8296$. (Table II.)

GREENWICH MEAN TIME.

Day of the Month.	THE MOON'S								
	SEMIDIAMETER.		HORIZONTAL PARALLAX.				UPPER TRANSIT.		AGE.
	Noon.	Midnight.	Noon.	Diff. for 1 Hour.	Midnight.	Diff. for 1 Hour.	Meridian of Greenwich.	Diff. for 1 Hour.	Noon.
	′ ″	′ ″	′ ″	″	′ ″	″	h m	m	d
1	16 23.2	16 29.8	60 2.4	+2.14	60 26.9	+1.91	9 17.9	2.51	11.8
2	16 35.6	16 40.5	60 48.4	1.63	61 6.1	1.29	10 21.1	2.74	12.8
3	16 44.2	16 46.5	61 19.4	0.91	61 27.9	+0.50	11 28.6	2.85	13.8
4	16 47.4	16 46.9	61 31.3	+0.06	61 29.3	−0.38	12 36.7	2.79	14.8
5	16 44.9	16 41.6	61 22.1	−0.80	61 10.0	1.20	13 41.6	2.60	15.8
6	16 37.1	16 31.5	60 53.4	1.55	60 32.9	1.85	14 40.9	2.35	16.8
7	16 25.0	16 17.9	60 9.1	−2.08	59 42.9	−2.25	15 34.4	2.12	17.8
8	16 10.3	16 2.4	59 15.0	2.36	58 46.1	2.42	16 23.2	1.96	18.8
9	15 54.4	15 46.5	58 16.8	2.42	57 47.8	2.38	17 8.9	1.86	19.8
10	15 38.8	15 31.4	57 19.7	−2.30	56 52.7	−2.19	17 52.8	1.81	20.8
11	15 24.5	15 18.1	56 27.2	2.05	56 3.5	1.89	18 36.4	1.82	21.8
12	15 12.2	15 6.8	55 41.8	1.72	55 22.2	1.55	19 20.8	1.88	22.8
13	15 2.0	14 57.8	55 4.6	−1.38	54 49.2	−1.20	20 6.9	1.96	23.8
14	14 54.2	14 51.2	54 35.9	1.02	54 24.7	0.85	20 55.0	2.05	24.8
15	14 48.6	14 46.6	54 15.4	0.69	54 8.0	0.54	21 45.0	2.12	25.8
16	14 45.1	14 44.0	54 2.4	−0.40	53 58.4	−0.27	22 36.2	2.14	26.8
17	14 43.3	14 43.1	53 56.0	−0.14	53 55.0	−0.02	23 27.3	2.11	27.8
18	14 43.2	14 43.7	53 55.5	+0.09	53 57.3	+0.20	6	. .	28.8
19	14 44.5	14 45.7	54 0.3	+0.31	54 4.6	+0.41	0 17.2	2.04	0.0
20	14 47.2	14 49.0	54 10.1	0.51	54 16.8	0.61	1 5.0	1.94	1.0
21	14 51.2	14 53.7	54 24.8	0.72	54 34.0	0.83	1 50.4	1.85	2.0
22	14 56.6	14 59.8	54 44.6	+0.94	54 56.5	+1.06	2 33.8	1.77	3.0
23	15 3.5	15 7.5	55 9.9	1.18	55 24.8	1.30	3 15.7	1.72	4.0
24	15 12.0	15 16.9	55 41.1	1.43	55 59.0	1.56	3 57.1	1.73	5.0
25	15 22.2	15 27.9	56 18.5	+1.68	56 39.4	+1.80	4 39.3	1.79	6.0
26	15 33.9	15 40.3	57 1.6	1.91	57 25.1	2.00	5 23.4	1.90	7.0
27	15 47.0	15 53.9	57 49.6	2.07	58 14.8	2.11	6 11.0	2.08	8.0
28	16 0.8	16 7.7	58 40.3	+2.12	59 5.7	+2.09	7 3.4	2.30	9.0
29	16 14.5	16 20.9	59 30.4	2.01	59 53.9	1.88	8 1.5	2.54	10.0
30	16 26.8	16 32.0	60 15.6	1.70	60 34.7	1.46	9 5.0	2.73	11.0
31	16 36.3	16 39.6	60 50.6	1.17	61 2.8	0.84	10 11.7	2.80	12.0
32	16 41.8	16 42.7	61 10.7	+0.47	61 14.0	+0.07	11 17.9	2.70	13.0

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	MONDAY 1.					WEDNESDAY 3.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	3 35 3.56	2.4849	N.21 46 0.3	11.279	0	5 44 26.92	2.8604	N.27 41 41.1	2.765
1	3 37 32.94	2.4946	21 57 13.3	11.152	1	5 47 18.66	2.8643	27 44 20.4	2.546
2	3 40 2.90	2.5042	22 8 18.6	11.023	2	5 50 10.62	2.8679	27 46 46.5	2.325
3	3 42 33.45	2.5139	22 19 16.1	10.892	3	5 53 2.79	2.8712	27 48 59.4	2.103
4	3 45 4.58	2.5236	22 30 5.7	10.759	4	5 55 55.16	2.8743	27 50 58.9	1.880
5	3 47 36.28	2.5332	22 40 47.3	10.624	5	5 58 47.71	2.8771	27 52 44.9	1.656
6	3 50 8.56	2.5428	22 51 20.6	10.486	6	6 1 40.42	2.8797	27 54 17.6	1.432
7	3 52 41.42	2.5524	23 1 45.5	10.345	7	6 4 33.28	2.8821	27 55 36.8	1.208
8	3 55 14.86	2.5620	23 12 2.0	10.202	8	6 7 26.27	2.8841	27 56 42.6	0.983
9	3 57 48.86	2.5715	23 22 9.9	10.057	9	6 10 19.38	2.8859	27 57 34.8	0.757
10	4 0 23.44	2.5810	23 32 9.0	9.910	10	6 13 12.59	2.8875	27 58 13.4	0.531
11	4 2 58.59	2.5905	23 41 59.1	9.761	11	6 16 5.88	2.8888	27 58 38.5	0.305
12	4 5 34.30	2.5999	23 51 40.2	9.609	12	6 18 59.24	2.8899	27 58 50.0	+0.078
13	4 8 10.57	2.6092	24 1 12.1	9.454	13	6 21 52.66	2.8907	27 58 47.8	−0.149
14	4 10 47.40	2.6185	24 10 34.7	9.297	14	6 24 46.12	2.8912	27 58 32.1	0.376
15	4 13 24.79	2.6278	24 19 47.8	9.138	15	6 27 39.60	2.8914	27 58 2.7	0.604
16	4 16 2.73	2.6369	24 28 51.3	8.977	16	6 30 33.09	2.8913	27 57 19.6	0.831
17	4 18 41.22	2.6460	24 37 45.1	8.814	17	6 33 26.57	2.8910	27 56 22.9	1.058
18	4 21 20.26	2.6550	24 46 29.1	8.649	18	6 36 20.02	2.8905	27 55 12.6	1.284
19	4 23 59.83	2.6639	24 55 3.0	8.481	19	6 39 13.43	2.8897	27 53 48.7	1.511
20	4 26 39.93	2.6728	25 3 26.7	8.310	20	6 42 6.78	2.8886	27 52 11.2	1.738
21	4 29 20.56	2.6815	25 11 40.2	8.138	21	6 45 0.06	2.8873	27 50 20.1	1.965
22	4 32 1.71	2.6901	25 19 43.3	7.964	22	6 47 53.26	2.8857	27 48 15.4	2.191
23	4 34 43.37	2.6986	N.25 27 35.8	7.787	23	6 50 46.35	2.8838	N.27 45 57.2	2.416
	TUESDAY 2.					THURSDAY 4.			
0	4 37 25.54	2.7070	N.25 35 17.7	7.608	0	6 53 39.32	2.8817	N.27 43 25.6	2.640
1	4 40 8.21	2.7153	25 42 48.8	7.427	1	6 56 32.16	2.8794	27 40 40.5	2.864
2	4 42 51.38	2.7235	25 50 9.0	7.244	2	6 59 24.85	2.8768	27 37 41.9	3.086
3	4 45 35.03	2.7316	25 57 18.1	7.059	3	7 2 17.38	2.8739	27 34 29.9	3.309
4	4 48 19.16	2.7395	26 4 16.0	6.872	4	7 5 9.73	2.8708	27 31 4.6	3.532
5	4 51 3.76	2.7472	26 11 2.7	6.683	5	7 8 1.88	2.8675	27 27 26.0	3.753
6	4 53 48.82	2.7548	26 17 38.0	6.492	6	7 10 53.83	2.8639	27 23 34.2	3.973
7	4 56 34.33	2.7623	26 24 1.7	6.299	7	7 13 45.55	2.8600	27 19 29.3	4.192
8	4 59 20.29	2.7696	26 30 13.8	6.104	8	7 16 37.03	2.8560	27 15 11.3	4.410
9	5 2 6.68	2.7767	26 36 14.2	5.907	9	7 19 28.27	2.8517	27 10 40.2	4.626
10	5 4 53.49	2.7836	26 42 2.7	5.708	10	7 22 19.24	2.8471	27 5 56.1	4.841
11	5 7 40.72	2.7904	26 47 39.2	5.508	11	7 25 9.93	2.8424	27 0 59.2	5.055
12	5 10 28.35	2.7970	26 53 3.6	5.306	12	7 28 0.33	2.8375	26 55 49.5	5.268
13	5 13 16.37	2.8034	26 58 15.9	5.102	13	7 30 50.43	2.8324	26 50 27.0	5.480
14	5 16 4.77	2.8097	27 3 15.9	4.897	14	7 33 40.21	2.8270	26 44 51.9	5.690
15	5 18 53.53	2.8157	27 8 3.5	4.690	15	7 36 29.67	2.8214	26 39 4.3	5.898
16	5 21 42.65	2.8215	27 12 38.6	4.481	16	7 39 18.78	2.8156	26 33 4.2	6.105
17	5 24 32.11	2.8272	27 17 1.2	4.271	17	7 42 7.54	2.8096	26 26 51.7	6.310
18	5 27 21.90	2.8326	27 21 11.2	4.060	18	7 44 55.94	2.8035	26 20 26.9	6.514
19	5 30 12.02	2.8378	27 25 8.5	3.847	19	7 47 43.96	2.7972	26 13 50.0	6.716
20	5 33 2.44	2.8428	27 28 52.9	3.633	20	7 50 31.60	2.7907	26 7 1.1	6.916
21	5 35 53.16	2.8475	27 32 24.4	3.418	21	7 53 18.84	2.7840	26 0 0.2	7.114
22	5 38 44.15	2.8520	27 35 43.0	3.201	22	7 56 5.68	2.7771	25 52 47.4	7.310
23	5 41 35.41	2.8563	27 38 48.6	2.983	23	7 58 52.10	2.7701	25 45 22.9	7.505
24	5 44 26.92	2.8604	N.27 41 41.1	2.765	24	8 1 38.10	2.7630	N.25 37 46.8	7.698

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	FRIDAY 5.					SUNDAY 7.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	8 1 38.10	2.7630	N.25 37 46.8	7.698	0	10 4 20.39	2.3399	N.16 28 57.7	14.260
1	8 4 23.66	2.7557	25 29 59.2	7.889	1	10 6 40.52	2.3313	16 14 39.7	14.339
2	8 7 8.78	2.7482	25 22 0.2	8.077	2	10 9 0.13	2.3227	16 0 17.0	14.416
3	8 9 53.45	2.7406	25 13 49.9	8.263	3	10 11 19.23	2.3142	15 45 49.7	14.491
4	8 12 37.65	2.7329	25 5 28.5	8.448	4	10 13 37.83	2.3058	15 31 18.1	14.563
5	8 15 21.38	2.7250	24 56 56.1	8.631	5	10 15 55.93	2.2974	15 16 42.2	14.633
6	8 18 4.64	2.7170	24 48 12.8	8.811	6	10 18 13.53	2.2891	15 2 2.1	14.702
7	8 20 47.42	2.7089	24 39 18.8	8.989	7	10 20 30.63	2.2810	14 47 18.0	14.768
8	8 23 29.71	2.7006	24 30 14.2	9.165	8	10 22 47.24	2.2729	14 32 29.9	14.832
9	8 26 11.50	2.6923	24 20 59.1	9.338	9	10 25 3.37	2.2648	14 17 38.1	14.894
10	8 28 52.78	2.6839	24 11 33.6	9.509	10	10 27 19.02	2.2569	14 2 42.7	14.954
11	8 31 33.56	2.6753	24 1 57.9	9.678	11	10 29 34.20	2.2490	13 47 43.7	15.012
12	8 34 13.83	2.6667	23 52 12.1	9.846	12	10 31 48.90	2.2411	13 32 41.3	15.068
13	8 36 53.58	2.6580	23 42 16.3	10.011	13	10 34 3.14	2.2334	13 17 35.6	15.122
14	8 39 32.80	2.6492	23 32 10.7	10.173	14	10 36 16.92	2.2258	13 2 26.7	15.173
15	8 42 11.49	2.6404	23 21 55.5	10.333	15	10 38 30.25	2.2183	12 47 14.8	15.223
16	8 44 49.65	2.6315	23 11 30.8	10.490	16	10 40 43.13	2.2109	12 31 59.9	15.272
17	8 47 27.28	2.6225	23 0 56.7	10.645	17	10 42 55.56	2.2035	12 16 42.1	15.319
18	8 50 4.37	2.6135	22 50 13.4	10.798	18	10 45 7.55	2.1962	12 1 21.6	15.363
19	8 52 40.91	2.6045	22 39 21.0	10.948	19	10 47 19.11	2.1891	11 45 58.6	15.405
20	8 55 16.90	2.5954	22 28 19.6	11.096	20	10 49 30.24	2.1820	11 30 33.1	15.446
21	8 57 52.35	2.5862	22 17 9.4	11.242	21	10 51 40.95	2.1750	11 15 5.2	15.485
22	9 0 27.25	2.5770	22 5 50.6	11.385	22	10 53 51.24	2.1681	10 59 35.0	15.522
23	9 3 1.60	2.5678	N.21 54 23.3	11.525	23	10 56 1.12	2.1613	N.10 44 2.6	15.557
	SATURDAY 6.					MONDAY 8.			
0	9 5 35.40	2.5586	N.21 42 47.6	11.663	0	10 58 10.60	2.1546	N.10 28 28.1	15.590
1	9 8 8.64	2.5493	21 31 3.7	11.800	1	11 0 19.68	2.1479	10 12 51.7	15.621
2	9 10 41.32	2.5400	21 19 11.7	11.933	2	11 2 28.36	2.1414	9 57 13.5	15.651
3	9 13 13.44	2.5307	21 7 11.7	12.064	3	11 4 36.65	2.1350	9 41 33.5	15.680
4	9 15 45.00	2.5214	20 55 3.9	12.193	4	11 6 44.56	2.1287	9 25 51.9	15.707
5	9 18 16.01	2.5121	20 42 48.5	12.319	5	11 8 52.10	2.1225	9 10 8.8	15.732
6	9 20 46.46	2.5028	20 30 25.7	12.443	6	11 10 59.27	2.1165	8 54 24.2	15.755
7	9 23 16.35	2.4936	20 17 55.5	12.564	7	11 13 6.07	2.1105	8 38 38.2	15.776
8	9 25 45.68	2.4843	20 5 18.1	12.682	8	11 15 12.51	2.1044	8 22 51.0	15.796
9	9 28 14.46	2.4750	19 52 33.6	12.798	9	11 17 18.59	2.0985	8 7 2.6	15.815
10	9 30 42.68	2.4657	19 39 42.2	12.912	10	11 19 24.33	2.0928	7 51 13.2	15.832
11	9 33 10.35	2.4564	19 26 44.1	13.023	11	11 21 29.73	2.0872	7 35 22.8	15.847
12	9 35 37.46	2.4472	19 13 39.4	13.133	12	11 23 34.80	2.0817	7 19 31.5	15.861
13	9 38 4.02	2.4380	19 0 28.2	13.240	13	11 25 39.54	2.0763	7 3 39.4	15.874
14	9 40 30.03	2.4289	18 47 10.7	13.343	14	11 27 43.95	2.0709	6 47 46.7	15.885
15	9 42 55.49	2.4198	18 33 46.9	13.445	15	11 29 48.04	2.0656	6 31 53.3	15.894
16	9 45 20.40	2.4107	18 20 17.0	13.546	16	11 31 51.82	2.0605	6 15 59.4	15.902
17	9 47 44.77	2.4017	18 6 41.3	13.644	17	11 33 55.30	2.0555	6 0 5.1	15.909
18	9 50 8.60	2.3927	17 52 59.9	13.738	18	11 35 58.48	2.0505	5 44 10.4	15.914
19	9 52 31.90	2.3837	17 39 12.8	13.830	19	11 38 1.36	2.0457	5 28 15.4	15.918
20	9 54 54.66	2.3748	17 25 20.2	13.921	20	11 40 3.96	2.0410	5 12 20.3	15.920
21	9 57 16.88	2.3660	17 11 22.3	14.009	21	11 42 6.28	2.0363	4 56 25.0	15.921
22	9 59 38.57	2.3572	16 57 19.1	14.095	22	11 44 8.32	2.0318	4 40 29.8	15.921
23	10 1 59.74	2.3485	16 43 10.9	14.179	23	11 46 10.09	2.0274	4 24 34.6	15.919
24	10 4 20.39	2.3399	N.16 28 57.7	14.260	24	11 48 11.60	2.0230	N. 4 8 39.5	15.916

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	TUESDAY 9.					THURSDAY 11.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	11 48 11.60	2.0230	N. 4 8 39.5	15.916	0	13 22 6.25	1.9245	S. 8 10 27.6	14.500
1	11 50 12.85	2.0187	3 52 44.6	15.912	1	13 24 1.72	1.9247	8 24 56.0	14.448
2	11 52 13.85	2.0146	3 36 50.0	15.907	2	13 25 57.20	1.9248	8 39 21.3	14.395
3	11 54 14.60	2.0106	3 20 55.8	15.900	3	13 27 52.69	1.9250	8 53 43.4	14.341
4	11 56 15.12	2.0066	3 5 2.1	15.892	4	13 29 48.20	1.9254	9 8 2.3	14.287
5	11 58 15.40	2.0027	2 49 8.9	15.883	5	13 31 43.72	1.9258	9 22 17.9	14.232
6	12 0 15.45	1.9990	2 33 16.3	15.872	6	13 33 39.27	1.9261	9 36 30.1	14.176
7	12 2 15.28	1.9954	2 17 24.3	15.860	7	13 35 34.85	1.9265	9 50 39.0	14.119
8	12 4 14.89	1.9918	2 1 33.0	15.847	8	13 37 30.46	1.9271	10 4 44.4	14.061
9	12 6 14.29	1.9883	1 45 42.5	15.833	9	13 39 26.10	1.9278	10 18 46.4	14.003
10	12 8 13.49	1.9850	1 29 52.9	15.818	10	13 41 21.79	1.9286	10 32 44.8	13.944
11	12 10 12.49	1.9818	1 14 4.3	15.802	11	13 43 17.52	1.9294	10 46 39.7	13.884
12	12 12 11.30	1.9786	0 58 16.7	15.785	12	13 45 13.30	1.9302	11 0 30.9	13.823
13	12 14 9.92	1.9754	0 42 30.2	15.766	13	13 47 9.14	1.9311	11 14 18.5	13.762
14	12 16 8.35	1.9724	0 26 44.8	15.746	14	13 49 5.03	1.9321	11 28 2.4	13.700
15	12 18 6.61	1.9696	N. 0 11 0.6	15.726	15	13 51 0.98	1.9331	11 41 42.5	13.637
16	12 20 4.70	1.9668	S. 0 4 42.3	15.705	16	13 52 57.00	1.9342	11 55 18.8	13.574
17	12 22 2.63	1.9641	0 20 23.9	15.682	17	13 54 53.09	1.9354	12 8 51.3	13.509
18	12 24 0.40	1.9615	0 36 4.1	15.658	18	13 56 49.25	1.9367	12 22 19.9	13.444
19	12 25 58.01	1.9590	0 51 42.8	15.633	19	13 58 45.49	1.9381	12 35 44.6	13.378
20	12 27 55.47	1.9566	1 7 19.9	15.607	20	14 0 41.81	1.9395	12 49 5.3	13.311
21	12 29 52.79	1.9543	1 22 55.5	15.580	21	14 2 38.22	1.9409	13 2 22.0	13.244
22	12 31 49.98	1.9521	1 38 29.5	15.552	22	14 4 34.71	1.9424	13 15 34.6	13.176
23	12 33 47.04	1.9500	S. 1 54 1.7	15.523	23	14 6 31.30	1.9440	S. 13 28 43.1	13.107
	WEDNESDAY 10.					FRIDAY 12.			
0	12 35 43.97	1.9479	S. 2 9 32.2	15.493	0	14 8 27.99	1.9456	S. 13 41 47.4	13.037
1	12 37 40.78	1.9458	2 25 0.8	15.462	1	14 10 24.78	1.9473	13 54 47.5	12.967
2	12 39 37.47	1.9439	2 40 27.6	15.430	2	14 12 21.67	1.9491	14 7 43.4	12.896
3	12 41 34.06	1.9421	2 55 52.4	15.397	3	14 14 18.66	1.9509	14 20 35.0	12.824
4	12 43 30.54	1.9404	3 11 15.2	15.363	4	14 16 15.77	1.9527	14 33 22.3	12.751
5	12 45 26.92	1.9388	3 26 36.0	15.328	5	14 18 12.99	1.9546	14 46 5.2	12.678
6	12 47 23.21	1.9372	3 41 54.6	15.292	6	14 20 10.33	1.9566	14 58 43.7	12.604
7	12 49 19.41	1.9357	3 57 11.1	15.256	7	14 22 7.79	1.9586	15 11 17.7	12.529
8	12 51 15.53	1.9343	4 12 25.4	15.219	8	14 24 5.38	1.9607	15 23 47.2	12.454
9	12 53 11.57	1.9330	4 27 37.4	15.180	9	14 26 3.09	1.9629	15 36 12.1	12.377
10	12 55 7.53	1.9318	4 42 47.0	15.140	10	14 28 0.93	1.9651	15 48 32.4	12.300
11	12 57 3.43	1.9309	4 57 54.2	15.100	11	14 29 58.91	1.9673	16 0 48.1	12.222
12	12 58 59.27	1.9301	5 12 59.0	15.059	12	14 31 57.02	1.9696	16 12 59.1	12.143
13	13 0 55.05	1.9292	5 28 1.3	15.017	13	14 33 55.27	1.9720	16 25 5.3	12.064
14	13 2 50.77	1.9284	5 43 1.1	14.975	14	14 35 53.66	1.9744	16 37 6.8	11.984
15	13 4 46.45	1.9276	5 57 58.3	14.931	15	14 37 52.20	1.9768	16 49 3.5	11.904
16	13 6 42.09	1.9269	6 12 52.8	14.886	16	14 39 50.89	1.9793	17 0 55.3	11.823
17	13 8 37.69	1.9263	6 27 44.6	14.841	17	14 41 49.73	1.9819	17 12 42.2	11.740
18	13 10 33.26	1.9258	6 42 33.7	14.795	18	14 43 48.72	1.9845	17 24 24.1	11.657
19	13 12 28.80	1.9254	6 57 20.0	14.748	19	14 45 47.86	1.9871	17 36 1.0	11.574
20	13 14 24.31	1.9250	7 12 3.4	14.700	20	14 47 47.16	1.9897	17 47 32.9	11.489
21	13 16 19.81	1.9247	7 26 43.9	14.651	21	14 49 46.63	1.9924	17 58 59.7	11.404
22	13 18 15.30	1.9245	7 41 21.5	14.601	22	14 51 46.26	1.9952	18 10 21.4	11.317
23	13 20 10.78	1.9244	7 55 56.1	14.551	23	14 53 46.06	1.9980	18 21 37.8	11.231
24	13 22 6.25	1.9245	S. 8 10 27.6	14.500	24	14 55 46.02	2.0008	S. 18 32 49.1	11.144

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	SATURDAY 13.					MONDAY 15.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	14 55 46.02	2.0008	S.18 32 49.1	11.144	0	16 35 26.47	2.1533	S.25 33 30.8	6.120
1	14 57 46.15	2.0036	18 43 55.1	11.056	1	16 37 35.76	2.1563	25 39 34.4	5.999
2	14 59 46.45	2.0065	18 54 55.8	10.967	2	16 39 45.23	2.1593	25 45 30.7	5.877
3	15 1 46.93	2.0095	19 5 51.2	10.878	3	16 41 54.87	2.1622	25 51 19.7	5.755
4	15 3 47.58	2.0124	19 16 41.2	10.788	4	16 44 4.68	2.1650	25 57 1.4	5.633
5	15 5 48.42	2.0153	19 27 25.7	10.696	5	16 46 14.66	2.1677	26 2 35.7	5.510
6	15 7 49.43	2.0183	19 38 4.7	10.604	6	16 48 24.80	2.1704	26 8 2.6	5.386
7	15 9 50.62	2.0215	19 48 38.2	10.512	7	16 50 35.11	2.1731	26 13 22.1	5.262
8	15 11 52.00	2.0246	19 59 6.2	10.419	8	16 52 45.58	2.1757	26 18 34.1	5.138
9	15 13 53.57	2.0276	20 9 28.5	10.325	9	16 54 56.21	2.1783	26 23 38.6	5.013
10	15 15 55.32	2.0308	20 19 45.2	10.231	10	16 57 6.99	2.1809	26 28 35.6	4.887
11	15 17 57.26	2.0340	20 29 56.2	10.136	11	16 59 17.92	2.1834	26 33 25.0	4.761
12	15 19 59.39	2.0371	20 40 1.5	10.040	12	17 1 29.00	2.1858	26 38 6.9	4.635
13	15 22 1.71	2.0402	20 50 1.0	9.943	13	17 3 40.22	2.1882	26 42 41.2	4.508
14	15 24 4.22	2.0434	20 59 54.6	9.845	14	17 5 51.59	2.1906	26 47 7.8	4.380
15	15 26 6.92	2.0466	21 9 42.4	9.747	15	17 8 3.10	2.1929	26 51 26.7	4.252
16	15 28 9.82	2.0498	21 19 24.3	9.648	16	17 10 14.75	2.1951	26 55 38.0	4.124
17	15 30 12.91	2.0530	21 29 0.2	9.548	17	17 12 26.52	2.1973	26 59 41.5	3.995
18	15 32 16.20	2.0562	21 38 30.1	9.448	18	17 14 38.43	2.1995	27 3 37.3	3.865
19	15 34 19.69	2.0596	21 47 54.0	9.347	19	17 16 50.46	2.2016	27 7 25.4	3.735
20	15 36 23.37	2.0630	21 57 11.8	9.245	20	17 19 2.61	2.2036	27 11 5.6	3.605
21	15 38 27.25	2.0663	22 6 23.4	9.143	21	17 21 14.88	2.2055	27 14 38.0	3.475
22	15 40 31.33	2.0696	22 15 28.8	9.040	22	17 23 27.26	2.2073	27 18 2.6	3.344
23	15 42 35.60	2.0729	S.22 24 28.1	8.936	23	17 25 39.76	2.2091	S.27 21 19.4	3.213
	SUNDAY 14.					TUESDAY 16.			
0	15 44 40.07	2.0763	S.22 33 21.1	8.831	0	17 27 52.36	2.2109	S.27 24 28.3	3.082
1	15 46 44.75	2.0796	22 42 7.8	8.725	1	17 30 5.06	2.2126	27 27 29.2	2.950
2	15 48 49.63	2.0829	22 50 48.2	8.619	2	17 32 17.86	2.2142	27 30 22.2	2.818
3	15 50 54.70	2.0862	22 59 22.2	8.513	3	17 34 30.76	2.2157	27 33 7.3	2.686
4	15 52 59.97	2.0895	23 7 49.8	8.406	4	17 36 43.75	2.2171	27 35 44.5	2.553
5	15 55 5.44	2.0929	23 16 10.9	8.298	5	17 38 56.82	2.2185	27 38 13.6	2.420
6	15 57 11.11	2.0962	23 24 25.5	8.189	6	17 41 9.97	2.2198	27 40 34.8	2.287
7	15 59 16.98	2.0995	23 32 33.5	8.079	7	17 43 23.19	2.2210	27 42 48.0	2.153
8	16 1 23.05	2.1028	23 40 35.0	7.969	8	17 45 36.49	2.2222	27 44 53.2	2.019
9	16 3 29.32	2.1061	23 48 29.9	7.858	9	17 47 49.85	2.2233	27 46 50.3	1.885
10	16 5 35.78	2.1094	23 56 18.1	7.747	10	17 50 3.28	2.2243	27 48 39.4	1.751
11	16 7 42.44	2.1126	24 3 59.5	7.635	11	17 52 16.77	2.2253	27 50 20.4	1.617
12	16 9 49.30	2.1159	24 11 34.2	7.522	12	17 54 30.31	2.2262	27 51 53.4	1.483
13	16 11 56.35	2.1192	24 19 2.1	7.409	13	17 56 43.90	2.2269	27 53 18.3	1.348
14	16 14 3.60	2.1224	24 26 23.2	7.295	14	17 58 57.53	2.2276	27 54 35.1	1.213
15	16 16 11.04	2.1256	24 33 37.5	7.180	15	18 1 11.21	2.2283	27 55 43.9	1.078
16	16 18 18.67	2.1288	24 40 44.9	7.065	16	18 3 24.92	2.2288	27 56 44.5	0.943
17	16 20 26.50	2.1320	24 47 45.3	6.949	17	18 5 38.66	2.2292	27 57 37.0	0.808
18	16 22 34.51	2.1351	24 54 38.8	6.832	18	18 7 52.43	2.2296	27 58 21.4	0.673
19	16 24 42.71	2.1382	25 1 25.2	6.715	19	18 10 6.21	2.2299	27 58 57.7	0.538
20	16 26 51.10	2.1413	25 8 4.6	6.597	20	18 12 20.01	2.2301	27 59 25.9	0.402
21	16 28 59.67	2.1443	25 14 36.9	6.478	21	18 14 33.83	2.2302	27 59 46.0	0.267
22	16 31 8.42	2.1474	25 21 2.0	6.359	22	18 16 47.65	2.2303	27 59 58.0	−0.132
23	16 33 17.35	2.1504	25 27 20.0	6.240	23	18 19 1.46	2.2303	28 0 1.8	+0.004
24	16 35 26.47	2.1533	S.25 33 30.8	6.120	24	18 21 15.28	2.2301	S.27 59 57.5	0.140

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	WEDNESDAY 17.					FRIDAY 19.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	18 21 15.28	2.2301	S. 27 59 57.5	0.140	0	20 6 42.89	2.1380	S. 25 21 9.0	6.331
1	18 23 29.09	2.2299	27 59 45.1	0.275	1	20 8 51.06	2.1345	25 14 45.6	6.448
2	18 25 42.88	2.2297	27 59 24.5	0.410	2	20 10 59.03	2.1311	25 8 15.2	6.564
3	18 27 56.66	2.2294	27 58 55.8	0.546	3	20 13 6.80	2.1277	25 1 37.9	6.680
4	18 30 10.41	2.2290	27 58 19.0	0.681	4	20 15 14.36	2.1243	24 54 53.6	6.795
5	18 32 24.13	2.2285	27 57 34.1	0.816	5	20 17 21.71	2.1208	24 48 2.4	6.909
6	18 34 37.82	2.2279	27 56 41.1	0.951	6	20 19 28.85	2.1172	24 41 4.4	7.023
7	18 36 51.47	2.2272	27 55 40.0	1.086	7	20 21 35.78	2.1137	24 33 59.6	7.136
8	18 39 5.08	2.2264	27 54 30.8	1.221	8	20 23 42.50	2.1101	24 26 48.0	7.248
9	18 41 18.64	2.2256	27 53 13.6	1.355	9	20 25 49.00	2.1064	24 19 29.7	7.360
10	18 43 32.15	2.2248	27 51 48.3	1.489	10	20 27 55.28	2.1028	24 12 4.7	7.471
11	18 45 45.60	2.2238	27 50 14.9	1.623	11	20 30 1.34	2.0992	24 4 33.1	7.581
12	18 47 58.99	2.2226	27 48 33.4	1.758	12	20 32 7.18	2.0955	23 56 55.0	7.690
13	18 50 12.31	2.2214	27 46 43.9	1.892	13	20 34 12.80	2.0918	23 49 10.4	7.798
14	18 52 25.56	2.2202	27 44 46.4	2.025	14	20 36 18.20	2.0881	23 41 19.3	7.906
15	18 54 38.74	2.2189	27 42 40.9	2.159	15	20 38 23.38	2.0844	23 33 21.7	8.013
16	18 56 51.83	2.2175	27 40 27.4	2.292	16	20 40 28.33	2.0807	23 25 17.6	8.119
17	18 59 4.84	2.2160	27 38 5.9	2.425	17	20 42 33.05	2.0769	23 17 7.2	8.225
18	19 1 17.76	2.2145	27 35 36.4	2.557	18	20 44 37.55	2.0731	23 8 50.5	8.330
19	19 3 30.58	2.2129	27 32 59.0	2.689	19	20 46 41.83	2.0693	23 0 27.6	8.434
20	19 5 43.30	2.2111	27 30 13.7	2.821	20	20 48 45.88	2.0655	22 51 58.5	8.537
21	19 7 55.91	2.2093	27 27 20.5	2.953	21	20 50 49.70	2.0617	22 43 23.2	8.639
22	19 10 8.42	2.2075	27 24 19.4	3.084	22	20 52 53.29	2.0579	22 34 41.8	8.740
23	19 12 20.82	2.2056	S. 27 21 10.4	3.215	23	20 54 56.65	2.0541	S. 22 25 54.4	8.841
	THURSDAY 18.					SATURDAY 20.			
0	19 14 33.10	2.2036	S. 27 17 53.6	3.346	0	20 56 59.79	2.0503	S. 22 17 1.0	8.941
1	19 16 45.26	2.2016	27 14 28.9	3.476	1	20 59 2.70	2.0465	22 8 1.6	9.040
2	19 18 57.30	2.1995	27 10 56.5	3.605	2	21 1 5.38	2.0427	21 58 56.2	9.139
3	19 21 9.21	2.1973	27 7 16.3	3.735	3	21 3 7.83	2.0389	21 49 44.9	9.236
4	19 23 20.98	2.1951	27 3 28.4	3.864	4	21 5 10.05	2.0351	21 40 27.8	9.332
5	19 25 32.61	2.1928	26 59 32.7	3.992	5	21 7 12.04	2.0313	21 31 5.0	9.428
6	19 27 44.11	2.1904	26 55 29.4	4.120	6	21 9 13.80	2.0275	21 21 36.5	9.523
7	19 29 55.46	2.1879	26 51 18.4	4.247	7	21 11 15.34	2.0237	21 12 2.3	9.617
8	19 32 6.66	2.1854	26 46 59.7	4.374	8	21 13 16.65	2.0199	21 2 22.5	9.711
9	19 34 17.71	2.1829	26 42 33.5	4.501	9	21 15 17.73	2.0161	20 52 37.1	9.803
10	19 36 28.60	2.1803	26 37 59.7	4.627	10	21 17 18.59	2.0124	20 42 46.1	9.894
11	19 38 39.34	2.1776	26 33 18.3	4.752	11	21 19 19.22	2.0087	20 32 49.6	9.985
12	19 40 49.91	2.1748	26 28 29.4	4.877	12	21 21 19.63	2.0049	20 22 47.7	10.075
13	19 43 0.32	2.1720	26 23 33.0	5.002	13	21 23 19.81	2.0012	20 12 40.5	10.165
14	19 45 10.55	2.1691	26 18 29.2	5.126	14	21 25 19.77	1.9975	20 2 28.0	10.253
15	19 47 20.61	2.1662	26 13 17.9	5.249	15	21 27 19.51	1.9938	19 52 10.2	10.340
16	19 49 30.49	2.1633	26 7 59.3	5.371	16	21 29 19.03	1.9902	19 41 47.2	10.427
17	19 51 40.20	2.1603	26 2 33.3	5.493	17	21 31 18.33	1.9865	19 31 19.0	10.513
18	19 53 49.73	2.1572	25 57 0.0	5.615	18	21 33 17.41	1.9828	19 20 45.6	10.598
19	19 55 59.07	2.1541	25 51 19.5	5.736	19	21 35 16.28	1.9792	19 10 7.2	10.682
20	19 58 8.22	2.1510	25 45 31.7	5.856	20	21 37 14.93	1.9757	18 59 23.8	10.765
21	20 0 17.18	2.1478	25 39 36.7	5.976	21	21 39 13.37	1.9722	18 48 35.4	10.847
22	20 2 25.95	2.1445	25 33 34.6	6.095	22	21 41 11.59	1.9686	18 37 42.0	10.929
23	20 4 34.52	2.1413	25 27 25.3	6.213	23	21 43 9.60	1.9651	18 26 43.8	11.010
24	20 6 42.89	2.1380	S. 25 21 9.0	6.331	24	21 45 7.41	1.9617	S. 18 15 40.8	11.090

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	SUNDAY 21.					TUESDAY 23.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	21 45 7.41	1.9617	S. 18 15 40.8	11.090	0	23 16 4.18	1.8475	S. 8 7 4.1	13.954
1	21 47 5.01	1.9583	18 4 33.0	11.169	1	23 17 55.00	1.8465	7 53 5.7	13.994
2	21 49 2.40	1.9549	17 53 20.5	11.247	2	23 19 45.77	1.8456	7 39 4.9	14.033
3	21 50 59.59	1.9515	17 42 3.3	11.325	3	23 21 36.48	1.8448	7 25 1.8	14.071
4	21 52 56.58	1.9481	17 30 41.5	11.402	4	23 23 27.15	1.8440	7 10 56.4	14.108
5	21 54 53.37	1.9448	17 19 15.1	11.478	5	23 25 17.77	1.8433	6 56 48.8	14.144
6	21 56 49.96	1.9416	17 7 44.2	11.553	6	23 27 8.35	1.8427	6 42 39.0	14.180
7	21 58 46.35	1.9383	16 56 8.8	11.627	7	23 28 58.90	1.8422	6 28 27.1	14.215
8	22 0 42.55	1.9351	16 44 29.0	11.700	8	23 30 49.42	1.8417	6 14 13.2	14.249
9	22 2 38.56	1.9320	16 32 44.8	11.772	9	23 32 39.91	1.8412	5 59 57.2	14.283
10	22 4 34.38	1.9288	16 20 56.3	11.844	10	23 34 30.37	1.8409	5 45 39.2	14.316
11	22 6 30.02	1.9257	16 9 3.5	11.915	11	23 36 20.82	1.8407	5 31 19.3	14.348
12	22 8 25.47	1.9227	15 57 6.5	11.984	12	23 38 11.25	1.8405	5 16 57.5	14.379
13	22 10 20.74	1.9197	15 45 5.4	12.053	13	23 40 1.68	1.8404	5 2 33.9	14.409
14	22 12 15.83	1.9167	15 33 0.2	12.122	14	23 41 52.10	1.8404	4 48 8.5	14.438
15	22 14 10.75	1.9138	15 20 50.9	12.189	15	23 43 42.52	1.8404	4 33 41.4	14.466
16	22 16 5.49	1.9110	15 8 37.6	12.255	16	23 45 32.94	1.8405	4 19 12.5	14.494
17	22 18 0.06	1.9082	14 56 20.3	12.321	17	23 47 23.37	1.8407	4 4 42.0	14.521
18	22 19 54.46	1.9054	14 43 59.0	12.386	18	23 49 13.82	1.8409	3 50 9.9	14.547
19	22 21 48.70	1.9026	14 31 33.9	12.450	19	23 51 4.29	1.8412	3 35 36.3	14.573
20	22 23 42.78	1.8999	14 19 5.0	12.513	20	23 52 54.78	1.8416	3 21 1.2	14.598
21	22 25 36.70	1.8973	14 6 32.3	12.575	21	23 54 45.29	1.8421	3 6 24.7	14.621
22	22 27 30.46	1.8947	13 53 55.9	12.637	22	23 56 35.83	1.8427	2 51 46.7	14.644
23	22 29 24.07	1.8922	S. 13 41 15.9	12.698	23	23 58 26.41	1.8433	S. 2 37 7.4	14.666
	MONDAY 22.					WEDNESDAY 24.			
0	22 31 17.53	1.8898	S. 13 28 32.2	12.757	0	0 0 17.03	1.8440	S. 2 22 26.8	14.687
1	22 33 10.84	1.8874	13 15 44.9	12.816	1	0 2 7.70	1.8448	2 7 45.0	14.708
2	22 35 4.01	1.8850	13 2 54.1	12.875	2	0 3 58.42	1.8457	1 53 1.9	14.727
3	22 36 57.04	1.8826	12 49 59.9	12.933	3	0 5 49.19	1.8467	1 38 17.7	14.745
4	22 38 49.93	1.8803	12 37 2.3	12.990	4	0 7 40.02	1.8478	1 23 32.4	14.763
5	22 40 42.68	1.8781	12 24 1.3	13.045	5	0 9 30.92	1.8490	1 8 46.1	14.781
6	22 42 35.30	1.8760	12 10 56.9	13.100	6	0 11 21.89	1.8503	0 53 58.8	14.797
7	22 44 27.80	1.8739	11 57 49.2	13.155	7	0 13 12.94	1.8515	0 39 10.5	14.812
8	22 46 20.18	1.8718	11 44 38.3	13.208	8	0 15 4.06	1.8528	0 24 21.3	14.827
9	22 48 12.43	1.8698	11 31 24.2	13.261	9	0 16 55.27	1.8543	S. 0 9 31.3	14.841
10	22 50 4.56	1.8679	11 18 7.0	13.313	10	0 18 46.57	1.8558	N. 0 5 19.5	14.854
11	22 51 56.58	1.8661	11 4 46.7	13.363	11	0 20 37.97	1.8574	0 20 11.1	14.865
12	22 53 48.49	1.8643	10 51 23.4	13.413	12	0 22 29.46	1.8591	0 35 3.4	14.876
13	22 55 40.30	1.8625	10 37 57.1	13.463	13	0 24 21.06	1.8609	0 49 56.3	14.887
14	22 57 32.00	1.8608	10 24 27.8	13.512	14	0 26 12.77	1.8627	1 4 49.8	14.896
15	22 59 23.60	1.8592	10 10 55.7	13.560	15	0 28 4.59	1.8647	1 19 43.7	14.904
16	23 1 15.11	1.8577	9 57 20.7	13.607	16	0 29 56.53	1.8668	1 34 38.2	14.911
17	23 3 6.52	1.8562	9 43 42.9	13.653	17	0 31 48.60	1.8689	1 49 33.1	14.918
18	23 4 57.85	1.8547	9 30 2.4	13.698	18	0 33 40.80	1.8711	2 4 28.4	14.924
19	23 6 49.09	1.8534	9 16 19.1	13.742	19	0 35 33.13	1.8734	2 19 24.0	14.928
20	23 8 40.25	1.8521	9 2 33.2	13.786	20	0 37 25.60	1.8758	2 34 19.8	14.932
21	23 10 31.34	1.8508	8 48 44.7	13.829	21	0 39 18.22	1.8782	2 49 15.8	14.935
22	23 12 22.35	1.8496	8 34 53.7	13.871	22	0 41 10.99	1.8807	3 4 12.0	14.937
23	23 14 13.30	1.8485	8 21 0.1	13.913	23	0 43 3.92	1.8834	3 19 8.3	14.938
24	23 16 4.18	1.8475	S. 8 7 4.1	13.954	24	0 44 57.01	1.8862	N. 3 34 4.6	14.938

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	THURSDAY 25.					SATURDAY 27.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	0 44 57.01	1.8862	N. 3 34 4.6	14.938	0	2 20 21.66	2.1244	N. 15 11 7.7	13.644
1	0 46 50.26	1.8890	3 49 0.9	14.937	1	2 22 29.34	2.1316	15 24 44.6	13.584
2	0 48 43.69	1.8919	4 3 57.1	14.935	2	2 24 37.46	2.1389	15 38 17.9	13.524
3	0 50 37.29	1.8949	4 18 53.1	14.933	3	2 26 46.01	2.1463	15 51 47.5	13.462
4	0 52 31.08	1.8980	4 33 49.0	14.930	4	2 28 55.00	2.1537	16 5 13.3	13.398
5	0 54 25.05	1.9012	4 48 44.6	14.925	5	2 31 4.44	2.1611	16 18 35.2	13.333
6	0 56 19.21	1.9044	5 3 39.9	14.919	6	2 33 14.33	2.1686	16 31 53.2	13.266
7	0 58 13.58	1.9077	5 18 34.9	14.912	7	2 35 24.68	2.1763	16 45 7.1	13.197
8	1 0 8.16	1.9112	5 33 29.5	14.904	8	2 37 35.49	2.1841	16 58 16.9	13.127
9	1 2 2.94	1.9148	5 48 23.5	14.896	9	2 39 46.77	2.1919	17 11 22.4	13.055
10	1 3 57.93	1.9184	6 3 16.9	14.887	10	2 41 58.52	2.1997	17 24 23.5	12.981
11	1 5 53.15	1.9221	6 18 9.8	14.876	11	2 44 10.74	2.2076	17 37 20.1	12.906
12	1 7 48.59	1.9259	6 33 2.0	14.864	12	2 46 23.44	2.2157	17 50 12.2	12.829
13	1 9 44.26	1.9298	6 47 53.5	14.851	13	2 48 36.62	2.2238	18 2 59.6	12.750
14	1 11 40.17	1.9338	7 2 44.1	14.837	14	2 50 50.29	2.2319	18 15 42.2	12.669
15	1 13 36.32	1.9379	7 17 33.8	14.822	15	2 53 4.46	2.2401	18 28 19.9	12.587
16	1 15 32.72	1.9421	7 32 22.6	14.806	16	2 55 19.12	2.2484	18 40 52.6	12.503
17	1 17 29.38	1.9464	7 47 10.5	14.789	17	2 57 34.27	2.2568	18 53 20.3	12.417
18	1 19 26.29	1.9508	8 1 57.3	14.770	18	2 59 49.93	2.2652	19 5 42.7	12.330
19	1 21 23.47	1.9552	8 16 42.9	14.750	19	3 2 6.10	2.2737	19 17 59.8	12.240
20	1 23 20.92	1.9597	8 31 27.3	14.730	20	3 4 22.78	2.2823	19 30 11.5	12.148
21	1 25 18.64	1.9643	8 46 10.5	14.709	21	3 6 39.97	2.2909	19 42 17.7	12.056
22	1 27 16.65	1.9691	9 0 52.4	14.686	22	3 8 57.68	2.2995	19 54 18.2	11.961
23	1 29 14.94	1.9740	N. 9 15 32.8	14.662	23	3 11 15.91	2.3082	N. 20 6 13.0	11.863
	FRIDAY 26.					SUNDAY 28.			
0	1 31 13.53	1.9789	N. 9 30 11.8	14.637	0	3 13 34.66	2.3169	N. 20 18 1.9	11.765
1	1 33 12.41	1.9839	9 44 49.2	14.610	1	3 15 53.94	2.3256	20 29 44.8	11.665
2	1 35 11.60	1.9890	9 59 25.0	14.581	2	3 18 13.74	2.3344	20 41 21.6	11.562
3	1 37 11.10	1.9942	10 13 59.1	14.553	3	3 20 34.07	2.3433	20 52 52.2	11.457
4	1 39 10.91	1.9995	10 28 31.4	14.524	4	3 22 54.94	2.3523	21 4 16.5	11.351
5	1 41 11.04	2.0049	10 43 1.9	14.492	5	3 25 16.34	2.3612	21 15 34.3	11.243
6	1 43 11.49	2.0104	10 57 30.5	14.460	6	3 27 38.28	2.3701	21 26 45.5	11.132
7	1 45 12.28	2.0160	11 11 57.1	14.426	7	3 30 0.76	2.3791	21 37 50.0	11.019
8	1 47 13.41	2.0216	11 26 21.6	14.391	8	3 32 23.77	2.3881	21 48 47.8	10.905
9	1 49 14.88	2.0273	11 40 44.0	14.355	9	3 34 47.33	2.3972	21 59 38.7	10.789
10	1 51 16.69	2.0332	11 55 4.2	14.317	10	3 37 11.43	2.4064	22 10 22.5	10.670
11	1 53 18.86	2.0392	12 9 22.1	14.278	11	3 39 36.08	2.4155	22 20 59.1	10.549
12	1 55 21.39	2.0452	12 23 37.6	14.238	12	3 42 1.27	2.4245	22 31 28.4	10.427
13	1 57 24.28	2.0513	12 37 50.6	14.197	13	3 44 27.01	2.4335	22 41 50.3	10.303
14	1 59 27.54	2.0575	12 52 1.1	14.154	14	3 46 53.29	2.4426	22 52 4.7	10.176
15	2 1 31.18	2.0638	13 6 9.0	14.109	15	3 49 20.12	2.4517	23 2 11.5	10.047
16	2 3 35.20	2.0702	13 20 14.2	14.063	16	3 51 47.50	2.4608	23 12 10.5	9.917
17	2 5 39.60	2.0766	13 34 16.6	14.016	17	3 54 15.42	2.4699	23 22 1.6	9.785
18	2 7 44.39	2.0832	13 48 16.1	13.967	18	3 56 43.89	2.4790	23 31 44.6	9.650
19	2 9 49.58	2.0899	14 2 12.6	13.917	19	3 59 12.90	2.4881	23 41 19.5	9.513
20	2 11 55.17	2.0966	14 16 6.1	13.866	20	4 1 42.46	2.4971	23 50 46.2	9.374
21	2 14 1.17	2.1034	14 29 56.4	13.813	21	4 4 12.56	2.5061	24 0 4.5	9.233
22	2 16 7.58	2.1102	14 43 43.5	13.758	22	4 6 43.20	2.5151	24 9 14.2	9.090
23	2 18 14.41	2.1172	14 57 27.3	13.702	23	4 9 14.38	2.5241	24 18 15.3	8.945
24	2 20 21.66	2.1244	N. 15 11 7.7	13.644	24	4 11 46.10	2.5331	N. 24 27 7.7	8.798

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	MONDAY 29.			
	h m s	s	° ′ ″	″
0	4 11 46.10	2.5331	N.24 27 7.7	8.798
1	4 14 18.35	2.5420	24 35 51.2	8.650
2	4 16 51.14	2.5508	24 44 25.7	8.499
3	4 19 24.46	2.5596	24 52 51.1	8.346
4	4 21 58.30	2.5684	25 1 7.2	8.191
5	4 24 32.67	2.5772	25 9 14.0	8 033
6	4 27 7.57	2.5859	25 17 11.3	7.874
7	4 29 42.98	2.5944	25 24 59.0	7.713
8	4 32 18.90	2.6028	25 32 37.0	7.550
9	4 34 55.32	2.6112	25 40 5.1	7.385
10	4 37 32.24	2.6196	25 47 23.2	7.218
11	4 40 9.67	2.6279	25 54 31.3	7.049
12	4 42 47.59	2.6360	26 1 29.2	6.878
13	4 45 26.00	2.6441	26 8 16.8	6.706
14	4 48 4.88	2.6521	26 14 53.9	6.532
15	4 50 44.24	2.6599	26 21 20.5	6.355
16	4 53 24.07	2.6677	26 27 36.5	6.176
17	4 56 4.36	2.6753	26 33 41.7	5.996
18	4 58 45.10	2.6827	26 39 36.0	5.814
19	5 1 26.29	2.6901	26 45 19.4	5.630
20	5 4 7.92	2.6974	26 50 51.7	5.445
21	5 6 49.98	2.7045	26 56 12.8	5.257
22	5 9 32.46	2.7115	27 1 22.6	5.068
23	5 12 15.36	2.7183	N.27 6 21.0	4.878
	TUESDAY 30.			
0	5 14 58.66	2.7249	N.27 11 7.9	4.686
1	5 17 42.35	2.7314	27 15 43.2	4.492
2	5 20 26.43	2.7378	27 20 6.9	4.296
3	5 23 10.89	2.7440	27 24 18.8	4.099
4	5 25 55.72	2.7500	27 28 18.8	3.901
5	5 28 40.90	2.7558	27 32 6.9	3.701
6	5 31 26.43	2.7615	27 35 43.0	3.500
7	5 34 12.29	2.7671	27 39 6.9	3.298
8	5 36 58.47	2.7724	27 42 18.7	3.094
9	5 39 44.96	2.7775	27 45 18.2	2.889
10	5 42 31.76	2.7824	27 48 5.3	2.682
11	5 45 18.85	2.7871	27 50 40.0	2.474
12	5 48 6.21	2.7916	27 53 2.3	2.266
13	5 50 53.84	2.7959	27 55 12.0	2.056
14	5 53 41.72	2.8000	27 57 9.1	1.845
15	5 56 29.84	2.8039	27 58 53.5	1.634
16	5 59 18.19	2.8076	28 0 25.2	1.422
17	6 2 6.75	2.8111	28 1 44.1	1.208
18	6 4 55.51	2.8143	28 2 50.1	0.993
19	6 7 44.46	2.8173	28 3 43.3	0.778
20	6 10 33.58	2.8201	28 4 23.5	0.562
21	6 13 22.86	2.8226	28 4 50.8	0.346
22	6 16 12.30	2.8249	28 5 5.1	+0.130
23	6 19 1.86	2.8270	28 5 6.4	−0.087
24	6 21 51.54	2.8289	N.28 4 54.6	0.306

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	WEDNESDAY 31.			
	h m s	s	° ′ ″	″
0	6 21 51.54	2.8289	N.28 4 54.6	0.306
1	6 24 41.33	2.8306	28 4 29.7	0.525
2	6 27 31.21	2.8320	28 3 51.7	0.743
3	6 30 21.17	2.8331	28 3 0.6	0.962
4	6 33 11.19	2.8340	28 1 56.3	1.181
5	6 36 1.26	2.8347	28 0 38.8	1.400
6	6 38 51.36	2.8352	27 59 8.2	1.620
7	6 41 41.49	2.8355	27 57 24.5	1.839
8	6 44 31.62	2.8355	27 55 27.6	2.058
9	6 47 21.74	2.8352	27 53 17.5	2.278
10	6 50 11.84	2.8347	27 50 54.3	2.497
11	6 53 1.91	2.8340	27 48 17.9	2.715
12	6 55 51.93	2.8331	27 45 28.4	2.933
13	6 58 41.88	2.8320	27 42 25.8	3.152
14	7 1 31.75	2.8305	27 39 10.1	3.370
15	7 4 21.53	2.8287	27 35 41.4	3.587
16	7 7 11.20	2.8269	27 31 59.6	3.804
17	7 10 0.75	2.8249	27 28 4.9	4.020
18	7 12 50.17	2.8225	27 23 57.2	4.236
19	7 15 39.45	2.8199	27 19 36.5	4.451
20	7 18 28.57	2.8172	27 15 3.0	4.665
21	7 21 17.51	2.8143	27 10 16.7	4.878
22	7 24 6.27	2.8111	27 5 17.6	5.090
23	7 26 54.83	2.8076	N.27 0 5.8	5.302
	THURSDAY, FEBRUARY 1.			
0	7 29 43.18	2.8040	N.26 54 41.3	5.513

PHASES OF THE MOON.

			d	h	m
○	Full Moon . . .	Jan.	4	1	29.5
☾	Last Quarter		10	19	42.8
●	New Moon		18	23	9.9
☽	First Quarter		26	20	51.2

			d	h
☾	Perigee	Jan.	4	1.6
☾	Apogee		17	13.9

FEBRUARY, 1912.

AT GREENWICH APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S					Sidereal Time of Semidiameter Passing Meridian.	Equation of Time, to be Added to Apparent Time.	Diff. for 1 Hour.
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.	Semidiameter.			
		h m s	s	° ′ ″	″	′ ″	s	m s	s
Thur.	1	20 55 1.49	10.222	S. 17 23 54.5	+41.89	16 15.76	68.37	13 38.41	0.365
Frid.	2	20 59 6.41	10.188	17 7 0.0	42.65	16 15.62	68.25	13 46.75	0.330
Sat.	3	21 3 10.51	10.154	16 49 47.5	43.39	16 15.47	68.14	13 54.27	0.296
SUN.	4	21 7 13.78	10.120	16 32 17.4	+44.12	16 15.32	68.02	14 0.96	0.262
Mon.	5	21 11 16.24	10.086	16 14 30.1	44.82	16 15.16	67.91	14 6.85	0.229
Tues.	6	21 15 17.90	10.052	15 56 25.9	45.52	16 15.00	67.79	14 11.94	0.196
Wed.	7	21 19 18.76	10.019	15 38 5.3	+46.20	16 14.83	67.68	14 16.24	0.163
Thur.	8	21 23 18.83	9.986	15 19 28.6	46.86	16 14.66	67.56	14 19.75	0.130
Frid.	9	21 27 18.11	9.954	15 0 36.2	47.51	16 14.48	67.45	14 22.47	0.097
Sat.	10	21 31 16.62	9.922	14 41 28.7	+48.13	16 14.30	67.33	14 24.41	0.065
SUN.	11	21 35 14.35	9.890	14 22 6.3	48.73	16 14.11	67.22	14 25.58	0.033
Mon.	12	21 39 11.32	9.858	14 2 29.4	49.32	16 13.92	67.11	14 25.99	0.002
Tues.	13	21 43 7.54	9.827	13 42 38.5	+49.89	16 13.72	67.00	14 25.65	0.030
Wed.	14	21 47 3.00	9.796	13 22 34.1	50.45	16 13.52	66.89	14 24.56	0.061
Thur.	15	21 50 57.72	9.765	13 2 16.6	50.99	16 13.32	66.78	14 22.73	0.091
Frid.	16	21 54 51.70	9.735	12 41 46.3	+51.52	16 13.12	66.68	14 20.16	0.121
Sat.	17	21 58 44.96	9.705	12 21 3.7	52.02	16 12.92	66.58	14 16.88	0.151
SUN.	18	22 2 37.51	9.675	12 0 9.3	52.51	16 12.71	66.48	14 12.89	0.181
Mon.	19	22 6 29.35	9.646	11 39 3.4	+52.97	16 12.50	66.38	14 8.19	0.210
Tues.	20	22 10 20.49	9.617	11 17 46.5	53.42	16 12.29	66.28	14 2.80	0.239
Wed.	21	22 14 10.95	9.588	10 56 19.1	53.85	16 12.08	66.18	13 56.72	0.267
Thur.	22	22 18 0.74	9.561	10 34 41.6	+54.27	16 11.86	66.08	13 49.97	0.295
Frid.	23	22 21 49.86	9.534	10 12 54.5	54.67	16 11.65	65.99	13 42.56	0.322
Sat.	24	22 25 38.34	9.507	9 50 58.0	55.04	16 11.43	65.90	13 34.51	0.348
SUN.	25	22 29 26.19	9.481	9 28 52.7	+55.40	16 11.21	65.81	13 25.82	0.374
Mon.	26	22 33 13.41	9.455	9 6 38.9	55.74	16 10.99	65.73	13 16.52	0.400
Tues.	27	22 37 0.04	9.429	8 44 17.2	56.07	16 10.76	65.64	13 6.61	0.424
Wed.	28	22 40 46.09	9.406	8 21 47.9	+56.38	16 10.52	65.56	12 56.13	0.448
Thur.	29	22 44 31.57	9.384	7 59 11.3	56.68	16 10.29	65.48	12 45.08	0.471
Frid.	30	22 48 16.50	9.362	S. 7 36 27.8	+56.95	16 10.05	65.40	12 33.49	0.493

Note.—The mean time of semidiameter passing may be found by subtracting $0^s.18$ from the sidereal time.
The sign + prefixed to the hourly change of declination indicates that south declinations are decreasing.

AT GREENWICH MEAN NOON.

ıy of Week.	Day of the Month.	THE SUN'S				Equation of Time, to be Subtracted from Mean Time.	Diff. for 1 Hour.	Sidereal Time, or Right Ascension of Mean Sun.
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.			
		h m s	s	° ′ ″	″	m s	s	h m s
ur.	1	20 54 59.17	10.221	S. 17 24 4.0	+41.88	13 38.33	0.365	20 41 20.84
d.	2	20 59 4.07	10.187	17 7 9.8	42.64	13 46.67	0.330	20 45 17.39
.	3	21 3 8.14	10.153	16 49 57.5	43.39	13 54.19	0.296	20 49 13.95
'N.	4	21 7 11.40	10.119	16 32 27.7	+44.11	14 0.90	0.263	20 53 10.51
ın.	5	21 11 13.86	10.086	16 14 40.6	44.81	14 6.80	0.229	20 57 7.06
es.	6	21 15 15.52	10.052	15 56 36.7	45.51	14 11.90	0.196	21 1 3.62
ed.	7	21 19 16.38	10.019	15 38 16.3	+46.19	14 16.20	0.163	21 5 0.18
ur.	8	21 23 16.44	9.986	15 19 39.8	46.85	14 19.71	0.130	21 8 56.73
d.	9	21 27 15.72	9.954	15 0 47.6	47.50	14 22.44	0.097	21 12 53.29
.	10	21 31 14.23	9.922	14 41 40.2	+48.13	14 24.39	0.065	21 16 49.84
'N.	11	21 35 11.97	9.890	14 22 18.0	48.73	14 25.57	0.034	21 20 46.40
ın.	12	21 39 8.95	9.858	14 2 41.3	49.32	14 25.99	0.002	21 24 42.95
es.	13	21 43 5.17	9.827	13 42 50.6	+49.89	14 25.65	0.030	21 28 39.51
ed.	14	21 47 0.64	9.796	13 22 46.3	50.45	14 24.57	0.061	21 32 36.07
ur.	15	21 50 55.37	9.765	13 2 28.9	50.99	14 22.75	0.091	21 36 32.62
d.	16	21 54 49.37	9.735	12 41 58.7	+51.52	14 20.20	0.121	21 40 29.18
.	17	21 58 42.65	9.705	12 21 16.1	52.02	14 16.92	0.151	21 44 25.73
'N.	18	22 2 35.21	9.675	12 0 21.7	52.51	14 12.93	0.181	21 48 22.29
ın.	19	22 6 27.07	9.646	11 39 15.9	+52.97	14 8.24	0.210	21 52 18.84
es.	20	22 10 18.24	9.617	11 17 59.0	53.42	14 2.85	0.239	21 56 15.40
ed.	21	22 14 8.73	9.589	10 56 31.6	53.85	13 56.78	0.267	22 0 11.95
ur.	22	22 17 58.54	9.562	10 34 54.0	+54.27	13 50.03	0.295	22 4 8.51
id.	23	22 21 47.69	9.535	10 13 6.8	54.67	13 42.63	0.322	22 8 5.06
t.	24	22 25 36.19	9.508	9 51 10.2	55.04	13 34.58	0.348	22 12 1.62
'N.	25	22 29 24.06	9.482	9 29 4.8	+55.40	13 25.90	0.374	22 15 58.17
ın.	26	22 33 11.32	9.456	9 6 51.0	55.74	13 16.60	0.400	22 19 54.72
es.	27	22 36 57.98	9.430	8 44 29.2	56.07	13 6.70	0.424	22 23 51.28
ed.	28	22 40 44.06	9.407	8 21 59.8	+56.38	12 56.22	0.448	22 27 47.84
ur.	29	22 44 29.57	9.385	7 59 23.2	56.68	12 45.18	0.471	22 31 44.39
id.	30	22 48 14.54	9.363	S. 7 36 39.7	+56.95	12 33.59	0.493	22 35 40.94

OTE.—The semidiameter for mean noon may be assumed the same as that for apparent noon. The sign + prefixed to the hourly change of declination indicates that south declinations are decreasing.

Diff. for 1 Hour, $+9^{s}.8565$. (Table III.)

AT GREENWICH MEAN NOON.

Day of the Month.	Day of the Year.	THE SUN'S True Longitude. λ	THE SUN'S True Longitude. λ′	Diff. for 1 Hour.	Latitude.	Logarithm of the Radius Vector of the Earth.	Diff. for 1 Hour.	Mean Time of Sidereal Noon.
		° ′ ″	′ ″	″	″			h m s
1	32	311 17 31.9	17 33.6	152.18	+0.67	9.993 6015	+26.0	3 18 6.62
2	33	312 18 23.7	18 25.2	152.13	0.66	9.993 6652	27.1	3 14 10.71
3	34	313 19 14.4	19 15.7	152.08	0.61	9.993 7314	28.1	3 10 14.80
4	35	314 20 3.9	20 5.1	152.04	+0.54	9.993 8002	+29.2	3 6 18.89
5	36	315 20 52.4	20 53.4	152.00	0.44	9.993 8716	30.2	3 2 22.98
6	37	316 21 39.8	21 40.7	151.96	0.32	9.993 9453	31.2	2 58 27.07
7	38	317 22 26.3	22 27.0	151.92	+0.18	9.994 0213	+32.1	2 54 31.16
8	39	318 23 11.8	23 12.4	151.87	+0.05	9.994 0994	32.9	2 50 35.25
9	40	319 23 56.3	23 56.7	151.83	−0.08	9.994 1794	33.7	2 46 39.34
10	41	320 24 39.7	24 40.0	151.79	−0.21	9.994 2613	+34.4	2 42 43.43
11	42	321 25 22.1	25 22.2	151.74	0.31	9.994 3448	35.1	2 38 47.52
12	43	322 26 3.3	26 3.4	151.69	0.40	9.994 4299	35.7	2 34 51.61
13	44	323 26 43.4	26 43.3	151.64	−0.46	9.994 5164	+36.3	2 30 55.70
14	45	324 27 22.3	27 22.0	151.59	0.51	9.994 6042	36.8	2 26 59.79
15	46	325 27 59.9	27 59.5	151.54	0.51	9.994 6932	37.3	2 23 3.88
16	47	326 28 36.1	28 35.6	151.48	−0.50	9.994 7834	+37.8	2 19 7.97
17	48	327 29 10.9	29 10.3	151.42	0.45	9.994 8746	38.2	2 15 12.06
18	49	328 29 44.2	29 43.5	151.36	0.40	9.994 9667	38.6	2 11 16.15
19	50	329 30 16.0	30 15.1	151.29	−0.32	9.995 0598	+39.0	2 7 20.24
20	51	330 30 46.2	30 45.1	151.22	0.21	9.995 1538	39.4	2 3 24.33
21	52	331 31 14.6	31 13.4	151.15	−0.09	9.995 2487	39.7	1 59 28.42
22	53	332 31 41.2	31 39.9	151.07	+0.04	9.995 3445	+40.1	1 55 32.51
23	54	333 32 6.0	32 4.5	150.99	0.16	9.995 4413	40.6	1 51 36.60
24	55	334 32 28.8	32 27.2	150.91	0.28	9.995 5392	41.0	1 47 40.69
25	56	335 32 49.6	32 47.9	150.82	+0.38	9.995 6382	+41.5	1 43 44.79
26	57	336 33 8.4	33 6.6	150.74	0.47	9.995 7385	42.0	1 39 48.88
27	58	337 33 25.1	33 23.2	150.66	0.52	9.995 8401	42.6	1 35 52.97
28	59	338 33 39.8	33 37.8	150.57	+0.54	9.995 9431	+43.2	1 31 57.06
29	60	339 33 52.5	33 50.4	150.49	0.54	9.996 0477	43.9	1 28 1.15
30	61	340 34 3.2	34 0.9	150.40	+0.50	9.996 1540	+44.6	1 24 5.24

NOTE.—The longitudes in the column λ are referred to the true equinox of their own date, while those in the column λ′ are referred to the mean equinox of the beginning of the Besselian fictitious year.

Diff. for 1 Hour, −9ˢ.8296. (Table II.)

GREENWICH MEAN TIME.

THE MOON'S

SEMIDIAMETER.		HORIZONTAL PARALLAX.				UPPER TRANSIT.		AGE.
Noon.	Midnight.	Noon.	Diff. for 1 Hour.	Midnight.	Diff. for 1 Hour.	Meridian of Greenwich.	Diff. for 1 Hour.	Noon.
′ ″	′ ″	′ ″	″	′ ″	″	h m	m	d
16 41.8	16 42.7	61 10.7	+0.47	61 14.0	+0.07	11 17.9	2.70	13.0
16 42.2	16 40.5	61 12.4	−0.33	61 6.0	−0.73	12 20.5	2.51	14.0
16 37.5	16 33.2	60 54.8	1.11	60 39.2	1.46	13 18.0	2.29	15.0
16 27.8	16 21.6	60 19.7	−1.77	59 56.8	−2.02	14 10.5	2.10	16.0
16 14.7	16 7.2	59 31.3	2.21	59 3.8	2.34	14 59.1	1.97	17.0
15 59.4	15 51.4	58 35.1	2.41	58 5.9	2.43	15 45.3	1.90	18.0
15 43.5	15 35.7	57 36.8	−2.40	57 8.3	−2.33	16 30.5	1.88	19.0
15 28.2	15 21.2	56 40.9	2.22	56 15.1	2.07	17 15.8	1.90	20.0
15 14.7	15 8.8	55 51.2	1.90	55 29.4	1.72	18 2.2	1.97	21.0
15 3.5	14 58.8	55 9.9	−1.52	54 52.8	−1.32	18 50.3	2.04	22.0
14 54.8	14 51.5	54 38.1	1.12	54 25.9	0.92	19 40.1	2.10	23.0
14 48.8	14 46.8	54 16.1	0.72	54 8.7	0.52	20 31.1	2.14	24.0
14 45.4	14 44.6	54 3.7	−0.33	54 0.8	−0.16	21 22.4	2.12	25.0
14 44.4	14 44.7	53 59.9	+0.01	54 1.0	+0.16	22 12.8	2.07	26.0
14 45.5	14 46.7	54 3.8	0.30	54 8.2	0.43	23 1.5	1.98	27.0
14 48.3	14 50.2	54 14.1	+0.55	54 21.3	+0.65	23 47.9	1.89	28.0
14 52.5	14 55.1	54 29.7	0.74	54 39.1	0.82	6	. .	29.0
14 57.9	15 1.0	54 49.5	0.90	55 0.7	0.97	0 32.2	1.80	0.3
15 4.2	15 7.7	55 12.7	+1.03	55 25.4	+1.09	1 14.8	1.75	1.3
15 11.4	15 15.2	55 38.8	1.15	55 52.9	1.20	1 56.7	1.74	2.3
15 19.2	15 23.4	56 7.6	1.25	56 23.0	1.31	2 38.7	1.77	3.3
15 27.7	15 32.3	56 39.0	+1.36	56 55.6	+1.41	3 22.0	1.85	4.3
15 37.0	15 41.8	57 12.9	1.46	57 30.7	1.50	4 7.9	1.99	5.3
15 46.8	15 51.8	57 48.9	1.53	58 7.4	1.55	4 57.7	2.17	6.3
15 56.9	16 2.0	58 26.1	+1.56	58 44.7	+1.54	5 52.3	2.38	7.3
16 7.0	16 11.8	59 3.0	1.49	59 20.5	1.41	6 51.8	2.57	8.3
16 16.2	16 20.3	59 36.9	1.30	59 51.8	1.16	7 55.1	2.68	9.3
16 23.8	16 26.7	60 4.8	+0.98	60 15.3	+0.76	8 59.4	2.66	10.3
16 28.8	16 30.0	60 23.0	+0.50	60 27.4	+0.22	10 1.9	2.53	11.3
16 30.2	16 29.5	60 28.3	−0.08	60 25.5	−0.39	11 0.6	2.35	12.3

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	THURSDAY 1.					SATURDAY 3.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	7 29 43.18	2.8040	N.26 54 41.3	5.513	0	9 37 14.68	2.4733	N.18 58 19.1	13.558
1	7 32 31.31	2.8002	26 49 4.3	5.722	1	9 39 42.82	2.4650	18 44 42.1	13.672
2	7 35 19.20	2.7961	26 43 14.8	5.930	2	9 42 10.46	2.4567	18 30 58.4	13.783
3	7 38 6.84	2.7919	26 37 12.8	6.137	3	9 44 37.61	2.4484	18 17 8.1	13.892
4	7 40 54.22	2.7875	26 30 58.4	6.342	4	9 47 4.27	2.4401	18 3 11.4	13.999
5	7 43 41.34	2.7829	26 24 31.7	6.546	5	9 49 30.43	2.4319	17 49 8.3	14.103
6	7 46 28.18	2.7782	26 17 52.8	6.749	6	9 51 56.10	2.4237	17 34 59.0	14.205
7	7 49 14.72	2.7732	26 11 1.8	6.951	7	9 54 21.28	2.4156	17 20 43.7	14.305
8	7 52 0.96	2.7681	26 3 58.7	7.152	8	9 56 45.98	2.4075	17 6 22.5	14.402
9	7 54 46.89	2.7629	25 56 43.6	7.351	9	9 59 10.19	2.3994	16 51 55.6	14.496
10	7 57 32.50	2.7574	25 49 16.6	7.548	10	10 1 33.91	2.3914	16 37 23.0	14.588
11	8 0 17.77	2.7517	25 41 37.9	7.743	11	10 3 57.16	2.3834	16 22 45.0	14.678
12	8 3 2.70	2.7459	25 33 47.5	7.937	12	10 6 19.93	2.3752	16 8 1.6	14.766
13	8 5 47.28	2.7400	25 25 45.5	8.129	13	10 8 42.22	2.3674	15 53 13.0	14.852
14	8 8 31.49	2.7339	25 17 32.0	8.319	14	10 11 4.04	2.3597	15 38 19.4	14.935
15	8 11 15.33	2.7276	25 9 7.2	8.508	15	10 13 25.39	2.3519	15 23 20.9	15.016
16	8 13 58.80	2.7212	25 0 31.1	8.695	16	10 15 46.28	2.3442	15 8 17.5	15.094
17	8 16 41.88	2.7147	24 51 43.8	8.880	17	10 18 6.71	2.3366	14 53 9.6	15.170
18	8 19 24.57	2.7081	24 42 45.4	9.063	18	10 20 26.67	2.3290	14 37 57.1	15.244
19	8 22 6.85	2.7014	24 33 36.1	9.244	19	10 22 46.18	2.3214	14 22 40.3	15.316
20	8 24 48.72	2.6945	24 24 16.0	9.424	20	10 25 5.24	2.3139	14 7 19.2	15.386
21	8 27 30.18	2.6875	24 14 45.2	9.602	21	10 27 23.85	2.3065	13 51 54.1	15.453
22	8 30 11.22	2.6804	24 5 3.8	9.777	22	10 29 42.01	2.2991	13 36 25.0	15.518
23	8 32 51.83	2.6732	N.23 55 11.9	9.950	23	10 31 59.73	2.2918	N.13 20 52.0	15.581
	FRIDAY 2.					SUNDAY 4.			
0	8 35 32.00	2.6659	N.23 45 9.7	10.122	0	10 34 17.02	2.2846	N.13 5 15.3	15.642
1	8 38 11.73	2.6585	23 34 57.3	10.292	1	10 36 33.88	2.2774	12 49 35.0	15.700
2	8 40 51.01	2.6510	23 24 34.8	10.459	2	10 38 50.31	2.2703	12 33 51.3	15.756
3	8 43 29.84	2.6434	23 14 2.3	10.624	3	10 41 6.31	2.2633	12 18 4.3	15.811
4	8 46 8.21	2.6357	23 3 20.0	10.786	4	10 43 21.90	2.2563	12 2 14.0	15.863
5	8 48 46.12	2.6279	22 52 28.0	10.946	5	10 45 37.07	2.2494	11 46 20.7	15.913
6	8 51 23.57	2.6201	22 41 26.4	11.105	6	10 47 51.84	2.2427	11 30 24.5	15.961
7	8 54 0.55	2.6123	22 30 15.4	11.261	7	10 50 6.20	2.2360	11 14 25.5	16.006
8	8 56 37.05	2.6044	22 18 55.1	11.415	8	10 52 20.16	2.2293	10 58 23.7	16.050
9	8 59 13.07	2.5964	22 7 25.6	11.567	9	10 54 33.72	2.2228	10 42 19.4	16.092
10	9 1 48.62	2.5884	21 55 47.1	11.716	10	10 56 46.89	2.2164	10 26 12.7	16.132
11	9 4 23.68	2.5803	21 43 59.7	11.863	11	10 58 59.68	2.2100	10 10 3.6	16.170
12	9 6 58.26	2.5721	21 32 3.6	12.008	12	11 1 12.09	2.2037	9 53 52.3	16.206
13	9 9 32.35	2.5640	21 19 58.8	12.150	13	11 3 24.12	2.1975	9 37 38.9	16.240
14	9 12 5.95	2.5559	21 7 45.6	12.290	14	11 5 35.78	2.1914	9 21 23.5	16.272
15	9 14 39.05	2.5477	20 55 24.1	12.428	15	11 7 47.07	2.1853	9 5 6.2	16.303
16	9 17 11.66	2.5395	20 42 54.4	12.563	16	11 9 58.01	2.1793	8 48 47.2	16.331
17	9 19 43.78	2.5312	20 30 16.6	12.696	17	11 12 8.60	2.1735	8 32 26.6	16.357
18	9 22 15.40	2.5229	20 17 30.9	12.826	18	11 14 18.84	2.1677	8 16 4.4	16.382
19	9 24 46.52	2.5147	20 4 37.5	12.954	19	11 16 28.73	2.1620	7 59 40.8	16.405
20	9 27 17.15	2.5064	19 51 36.5	13.080	20	11 18 38.28	2.1564	7 43 15.9	16.426
21	9 29 47.28	2.4980	19 38 28.0	13.203	21	11 20 47.49	2.1509	7 26 49.8	16.445
22	9 32 16.91	2.4897	19 25 12.1	13.324	22	11 22 56.38	2.1455	7 10 22.6	16.462
23	9 34 46.04	2.4815	19 11 49.1	13.442	23	11 25 4.95	2.1401	6 53 54.4	16.477
24	9 37 14.68	2.4733	N.18 58 19.1	13.558	24	11 27 13.20	2.1349	N. 6 37 25.4	16.490

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	MONDAY 5.					WEDNESDAY 7.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	11 27 13.20	2.1349	N. 6 37 25.4	16.490	0	13 5 23.93	1.9903	S. 6 21 0.9	15.437
1	11 29 21.14	2.1298	6 20 55.6	16.502	1	13 7 23.32	1.9894	6 36 25.6	15.386
2	11 31 28.77	2.1247	6 4 25.2	16.512	2	13 9 22.66	1.9886	6 51 47.2	15.333
3	11 33 36.10	2.1197	5 47 54.2	16.520	3	13 11 21.95	1.9878	7 7 5.6	15.279
4	11 35 43.14	2.1148	5 31 22.7	16.527	4	13 13 21.20	1.9871	7 22 20.7	15.225
5	11 37 49.89	2.1100	5 14 50.8	16.533	5	13 15 20.41	1.9865	7 37 32.6	15.170
6	11 39 56.35	2.1053	4 58 18.7	16.537	6	13 17 19.59	1.9860	7 52 41.1	15.114
7	11 42 2.53	2.1007	4 41 46.4	16.539	7	13 19 18.75	1.9856	8 7 46.3	15.057
8	11 44 8.44	2.0962	4 25 14.0	16.540	8	13 21 17.88	1.9853	8 22 48.0	14.999
9	11 46 14.08	2.0918	4 8 41.7	16.539	9	13 23 16.99	1.9851	8 37 46.1	14.940
10	11 48 19.46	2.0875	3 52 9.4	16.536	10	13 25 16.08	1.9849	8 52 40.7	14.880
11	11 50 24.59	2.0833	3 35 37.3	16.532	11	13 27 15.17	1.9848	9 7 31.7	14.819
12	11 52 29.47	2.0792	3 19 5.6	16.526	12	13 29 14.25	1.9848	9 22 19.0	14.757
13	11 54 34.10	2.0752	3 2 34.3	16.518	13	13 31 13.33	1.9848	9 37 2.5	14.694
14	11 56 38.49	2.0712	2 46 3.4	16.509	14	13 33 12.41	1.9849	9 51 42.2	14.630
15	11 58 42.64	2.0673	2 29 33.1	16.499	15	13 35 11.50	1.9851	10 6 18.1	14.566
16	12 0 46.57	2.0636	2 13 3.5	16.488	16	13 37 10.61	1.9853	10 20 50.1	14.501
17	12 2 50.27	2.0600	1 56 34.7	16.475	17	13 39 9.72	1.9855	10 35 18.2	14.435
18	12 4 53.76	2.0564	1 40 6.7	16.460	18	13 41 8.86	1.9858	10 49 42.3	14.368
19	12 6 57.03	2.0529	1 23 39.5	16.444	19	13 43 8.03	1.9863	11 4 2.4	14.300
20	12 9 0.10	2.0495	1 7 13.3	16.427	20	13 45 7.22	1.9869	11 18 18.3	14.231
21	12 11 2.97	2.0462	0 50 48.2	16.409	21	13 47 6.44	1.9875	11 32 30.1	14.161
22	12 13 5.64	2.0430	0 34 24.3	16.389	22	13 49 5.70	1.9881	11 46 37.7	14.091
23	12 15 8.12	2.0399	N. 0 18 1.7	16.367	23	13 51 5.00	1.9888	S. 12 0 41.1	14.020
	TUESDAY 6.					THURSDAY 8.			
0	12 17 10.42	2.0369	N. 0 1 40.4	16.344	0	13 53 4.35	1.9896	S. 12 14 40.1	13.947
1	12 19 12.54	2.0339	S. 0 14 39.5	16.320	1	13 55 3.74	1.9904	12 28 34.8	13.874
2	12 21 14.48	2.0310	0 30 57.9	16.294	2	13 57 3.19	1.9913	12 42 25.1	13.801
3	12 23 16.25	2.0282	0 47 14.8	16.267	3	13 59 2.69	1.9923	12 56 10.9	13.727
4	12 25 17.86	2.0255	1 3 30.0	16.240	4	14 1 2.25	1.9933	13 9 52.3	13.652
5	12 27 19.32	2.0230	1 19 43.5	16.212	5	14 3 1.87	1.9943	13 23 29.1	13.575
6	12 29 20.63	2.0205	1 35 55.2	16.181	6	14 5 1.56	1.9954	13 37 1.3	13.498
7	12 31 21.79	2.0180	1 52 5.1	16.148	7	14 7 1.32	1.9966	13 50 28.8	13.421
8	12 33 22.80	2.0157	2 8 13.1	16.116	8	14 9 1.16	1.9979	14 3 51.7	13.343
9	12 35 23.67	2.0135	2 24 19.0	16.082	9	14 11 1.07	1.9993	14 17 9.9	13.264
10	12 37 24.41	2.0114	2 40 22.9	16.046	10	14 13 1.07	2.0006	14 30 23.3	13.184
11	12 39 25.03	2.0093	2 56 24.6	16.010	11	14 15 1.15	2.0019	14 43 31.9	13.103
12	12 41 25.53	2.0073	3 12 24.1	15.973	12	14 17 1.31	2.0034	14 56 35.6	13.021
13	12 43 25.91	2.0055	3 28 21.3	15.934	13	14 19 1.56	2.0050	15 9 34.4	12.939
14	12 45 26.18	2.0037	3 44 16.1	15.894	14	14 21 1.91	2.0066	15 22 28.3	12.856
15	12 47 26.35	2.0019	4 0 8.6	15.853	15	14 23 2.36	2.0083	15 35 17.1	12.772
16	12 49 26.42	2.0002	4 15 58.5	15.811	16	14 25 2.91	2.0100	15 48 0.9	12.688
17	12 51 26.39	1.9987	4 31 45.9	15.768	17	14 27 3.56	2.0117	16 0 39.6	12.603
18	12 53 26.27	1.9973	4 47 30.7	15.724	18	14 29 4.32	2.0135	16 13 13.2	12.517
19	12 55 26.07	1.9959	5 3 12.8	15.679	19	14 31 5.19	2.0154	16 25 41.6	12.430
20	12 57 25.78	1.9946	5 18 52.1	15.633	20	14 33 6.17	2.0174	16 38 4.8	12.343
21	12 59 25.42	1.9934	5 34 28.7	15.586	21	14 35 7.26	2.0193	16 50 22.8	12.255
22	13 1 24.99	1.9923	5 50 2.4	15.537	22	14 37 8.47	2.0212	17 2 35.4	12.166
23	13 3 24.49	1.9913	6 5 33.1	15.487	23	14 39 9.81	2.0233	17 14 42.7	12.077
24	13 5 23.93	1.9903	S. 6 21 0.9	15.437	24	14 41 11.27	2.0254	S. 17 26 44.6	11.986

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	FRIDAY 9.					SUNDAY 11.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	14 41 11.27	2.0254	S.17 26 44.6	11.986	0	16 21 19.59	2.1519	S.25 5 16.6	6.876
1	14 43 12.85	2.0274	17 38 41.1	11.895	1	16 23 28.79	2.1545	25 12 5.6	6.755
2	14 45 14.56	2.0295	17 50 32.0	11.804	2	16 25 38.15	2.1571	25 18 47.3	6.633
3	14 47 16.40	2.0317	18 2 17.5	11.712	3	16 27 47.66	2.1598	25 25 21.6	6.511
4	14 49 18.37	2.0340	18 13 57.4	11.619	4	16 29 57.32	2.1624	25 31 48.6	6.389
5	14 51 20.47	2.0363	18 25 31.7	11.525	5	16 32 7.14	2.1649	25 38 8.3	6.266
6	14 53 22.71	2.0386	18 37 0.3	11.430	6	16 34 17.12	2.1675	25 44 20.5	6.142
7	14 55 25.10	2.0410	18 48 23.3	11.335	7	16 36 27.25	2.1700	25 50 25.3	6.018
8	14 57 27.63	2.0433	18 59 40.5	11.239	8	16 38 37.52	2.1724	25 56 22.7	5.893
9	14 59 30.30	2.0457	19 10 51.9	11.142	9	16 40 47.94	2.1748	26 2 12.5	5.768
10	15 1 33.11	2.0482	19 21 57.6	11.045	10	16 42 58.50	2.1772	26 7 54.8	5.643
11	15 3 36.07	2.0506	19 32 57.4	10.947	11	16 45 9.21	2.1796	26 13 29.6	5.517
12	15 5 39.18	2.0531	19 43 51.3	10.848	12	16 47 20.06	2.1820	26 18 56.8	5.391
13	15 7 42.45	2.0557	19 54 39.2	10.749	13	16 49 31.05	2.1843	26 24 16.4	5.264
14	15 9 45.87	2.0583	20 5 21.1	10.650	14	16 51 42.17	2.1865	26 29 28.4	5.136
15	15 11 49.44	2.0609	20 15 57.0	10.549	15	16 53 53.42	2.1887	26 34 32.8	5.008
16	15 13 53.17	2.0635	20 26 26.9	10.447	16	16 56 4.81	2.1908	26 39 29.5	4.880
17	15 15 57.05	2.0661	20 36 50.7	10.345	17	16 58 16.33	2.1930	26 44 18.5	4.752
18	15 18 1.09	2.0687	20 47 8.3	10.243	18	17 0 27.97	2.1951	26 48 59.7	4.623
19	15 20 5.29	2.0714	20 57 19.8	10.140	19	17 2 39.73	2.1970	26 53 33.2	4.493
20	15 22 9.65	2.0741	21 7 25.1	10.036	20	17 4 51.61	2.1990	26 57 58.9	4.363
21	15 24 14.18	2.0768	21 17 24.1	9.931	21	17 7 3.61	2.2009	27 2 16.8	4.233
22	15 26 18.87	2.0795	21 27 16.8	9.826	22	17 9 15.72	2.2027	27 6 26.9	4.103
23	15 28 23.72	2.0822	S.21 37 3.2	9.720	23	17 11 27.94	2.2046	S.27 10 29.2	3.972
	SATURDAY 10.					MONDAY 12.			
0	15 30 28.74	2.0850	S.21 46 43.2	9.613	0	17 13 40.27	2.2064	S.27 14 23.6	3.841
1	15 32 33.92	2.0878	21 56 16.8	9.506	1	17 15 52.70	2.2081	27 18 10.2	3.710
2	15 34 39.27	2.0906	22 5 43.9	9.398	2	17 18 5.24	2.2098	27 21 48.9	3.578
3	15 36 44.79	2.0934	22 15 4.6	9.290	3	17 20 17.88	2.2114	27 25 19.6	3.446
4	15 38 50.48	2.0962	22 24 18.8	9.181	4	17 22 30.61	2.2129	27 28 42.4	3.314
5	15 40 56.33	2.0990	22 33 26.4	9.071	5	17 24 43.43	2.2144	27 31 57.3	3.182
6	15 43 2.35	2.1018	22 42 27.4	8.961	6	17 26 56.33	2.2159	27 35 4.2	3.049
7	15 45 8.55	2.1046	22 51 21.7	8.850	7	17 29 9.32	2.2172	27 38 3.1	2.915
8	15 47 14.91	2.1074	23 0 9.4	8.739	8	17 31 22.39	2.2186	27 40 54.1	2.782
9	15 49 21.44	2.1102	23 8 50.4	8.627	9	17 33 35.54	2.2199	27 43 37.0	2.649
10	15 51 28.14	2.1130	23 17 24.7	8.514	10	17 35 48.76	2.2209	27 46 11.9	2.515
11	15 53 35.01	2.1159	23 25 52.2	8.401	11	17 38 2.05	2.2220	27 48 38.8	2.381
12	15 55 42.05	2.1188	23 34 12.8	8.287	12	17 40 15.41	2.2231	27 50 57.6	2.247
13	15 57 49.26	2.1216	23 42 26.6	8.173	13	17 42 28.83	2.2241	27 53 8.3	2.112
14	15 59 56.64	2.1244	23 50 33.6	8.058	14	17 44 42.30	2.2250	27 55 11.0	1.977
15	16 2 4.19	2.1272	23 58 33.6	7.942	15	17 46 55.82	2.2258	27 57 5.6	1.843
16	16 4 11.90	2.1300	24 6 26.6	7.826	16	17 49 9.40	2.2266	27 58 52.1	1.708
17	16 6 19.78	2.1328	24 14 12.7	7.709	17	17 51 23.02	2.2273	28 0 30.5	1.574
18	16 8 27.83	2.1356	24 21 51.8	7.591	18	17 53 36.68	2.2279	28 2 0.8	1.439
19	16 10 36.05	2.1384	24 29 23.7	7.473	19	17 55 50.38	2.2285	28 3 23.0	1.302
20	16 12 44.43	2.1411	24 36 48.6	7.355	20	17 58 4.10	2.2290	28 4 37.0	1.166
21	16 14 52.98	2.1438	24 44 6.4	7.236	21	18 0 17.86	2.2294	28 5 42.9	1.031
22	16 17 1.69	2.1465	24 51 17.0	7.116	22	18 2 31.64	2.2298	28 6 40.7	0.896
23	16 19 10.56	2.1492	24 58 20.4	6.996	23	18 4 45.44	2.2301	28 7 30.4	0.760
24	16 21 19.59	2.1519	S.25 5 16.6	6.876	24	18 6 59.25	2.2303	S.28 8 11.9	0.624

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	TUESDAY 13.					THURSDAY 15.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	18 6 59.25	2.2303	S.28 8 11.9	0.624	0	19 52 56.07	2.1588	S.26 4 6.7	5.685
1	18 9 13.08	2.2305	28 8 45.3	0.488	1	19 55 5.51	2.1559	25 58 21.9	5.807
2	18 11 26.91	2.2306	28 9 10.5	0.352	2	19 57 14.78	2.1529	25 52 29.8	5.929
3	18 13 40.75	2.2306	28 9 27.6	0.217	3	19 59 23.86	2.1499	25 46 30.4	6.050
4	18 15 54.58	2.2305	28 9 36.5	−0.082	4	20 1 32.76	2.1469	25 40 23.8	6.170
5	18 18 8.41	2.2303	28 9 37.3	+0.054	5	20 3 41.48	2.1438	25 34 10.0	6.290
6	18 20 22.22	2.2301	28 9 30.0	0.189	6	20 5 50.01	2.1406	25 27 49.1	6.409
7	18 22 36.02	2.2298	28 9 14.5	0.325	7	20 7 58.35	2.1374	25 21 21.0	6.527
8	18 24 49.80	2.2294	28 8 50.9	0.462	8	20 10 6.50	2.1342	25 14 45.8	6.645
9	18 27 3.55	2.2290	28 8 19.1	0.598	9	20 12 14.45	2.1310	25 8 3.6	6.762
10	18 29 17.27	2.2285	28 7 39.2	0.733	10	20 14 22.21	2.1277	25 1 14.4	6.878
11	18 31 30.96	2.2279	28 6 51.2	0.868	11	20 16 29.78	2.1244	24 54 18.2	6.994
12	18 33 44.61	2.2272	28 5 55.0	1.003	12	20 18 37.14	2.1211	24 47 15.1	7.109
13	18 35 58.22	2.2264	28 4 50.7	1.138	13	20 20 44.30	2.1177	24 40 5.1	7.223
14	18 38 11.78	2.2256	28 3 38.4	1.273	14	20 22 51.26	2.1143	24 32 48.2	7.337
15	18 40 25.29	2.2248	28 2 18.0	1.408	15	20 24 58.02	2.1109	24 25 24.5	7.451
16	18 42 38.75	2.2239	28 0 49.4	1.543	16	20 27 4.57	2.1075	24 17 54.1	7.564
17	18 44 52.15	2.2228	27 59 12.8	1.677	17	20 29 10.91	2.1040	24 10 17.0	7.675
18	18 47 5.49	2.2217	27 57 28.1	1.811	18	20 31 17.05	2.1005	24 2 33.2	7.786
19	18 49 18.76	2.2205	27 55 35.4	1.945	19	20 33 22.98	2.0970	23 54 42.7	7.896
20	18 51 31.95	2.2192	27 53 34.7	2.079	20	20 35 28.70	2.0935	23 46 45.6	8.005
21	18 53 45.07	2.2180	27 51 25.9	2.213	21	20 37 34.21	2.0900	23 38 42.0	8.114
22	18 55 58.11	2.2166	27 49 9.1	2.347	22	20 39 39.50	2.0864	23 30 31.8	8.222
23	18 58 11.07	2.2151	S.27 46 44.3	2.480	23	20 41 44.58	2.0829	S.23 22 15.2	8.330
	WEDNESDAY 14.					FRIDAY 16.			
0	19 0 23.94	2.2136	S.27 44 11.5	2.613	0	20 43 49.45	2.0794	S.23 13 52.2	8.437
1	19 2 36.71	2.2120	27 41 30.7	2.746	1	20 45 54.10	2.0758	23 5 22.8	8.543
2	19 4 49.38	2.2104	27 38 42.0	2.878	2	20 47 58.54	2.0722	22 56 47.1	8.648
3	19 7 1.95	2.2087	27 35 45.4	3.010	3	20 50 2.76	2.0686	22 48 5.1	8.752
4	19 9 14.42	2.2069	27 32 40.9	3.141	4	20 52 6.77	2.0650	22 39 16.8	8.856
5	19 11 26.78	2.2051	27 29 28.5	3.272	5	20 54 10.56	2.0614	22 30 22.3	8.959
6	19 13 39.03	2.2032	27 26 8.2	3.403	6	20 56 14.14	2.0578	22 21 21.7	9.061
7	19 15 51.16	2.2012	27 22 40.1	3.533	7	20 58 17.50	2.0542	22 12 15.0	9.162
8	19 18 3.17	2.1992	27 19 4.2	3.663	8	21 0 20.64	2.0506	22 3 2.3	9.262
9	19 20 15.05	2.1971	27 15 20.5	3.793	9	21 2 23.56	2.0470	21 53 43.6	9.362
10	19 22 26.81	2.1949	27 11 29.0	3.923	10	21 4 26.27	2.0434	21 44 18.9	9.461
11	19 24 38.44	2.1927	27 7 29.7	4.052	11	21 6 28.76	2.0398	21 34 48.3	9.559
12	19 26 49.93	2.1904	27 3 22.7	4.180	12	21 8 31.04	2.0362	21 25 11.8	9.656
13	19 29 1.28	2.1880	26 59 8.1	4.308	13	21 10 33.10	2.0326	21 15 29.5	9.752
14	19 31 12.49	2.1856	26 54 45.8	4.436	14	21 12 34.95	2.0290	21 5 41.5	9.848
15	19 33 23.56	2.1832	26 50 15.8	4.564	15	21 14 36.58	2.0254	20 55 47.8	9.943
16	19 35 34.48	2.1807	26 45 38.2	4.691	16	21 16 38.00	2.0218	20 45 48.4	10.037
17	19 37 45.24	2.1781	26 40 53.0	4.817	17	21 18 39.20	2.0182	20 35 43.3	10.131
18	19 39 55.84	2.1755	26 36 0.2	4.944	18	21 20 40.19	2.0147	20 25 32.6	10.224
19	19 42 6.29	2.1728	26 30 59.9	5.069	19	21 22 40.97	2.0112	20 15 16.4	10.315
20	19 44 16.58	2.1701	26 25 52.2	5.192	20	21 24 41.53	2.0077	20 4 54.8	10.405
21	19 46 26.71	2.1674	26 20 36.9	5.316	21	21 26 41.88	2.0042	19 54 27.8	10.495
22	19 48 36.66	2.1646	26 15 14.3	5.440	22	21 28 42.02	2.0007	19 43 55.4	10.584
23	19 50 46.45	2.1617	26 9 44.2	5.563	23	21 30 41.96	1.9972	19 33 17.7	10.672
24	19 52 56.07	2.1588	S.26 4 6.7	5.685	24	21 32 41.69	1.9937	S.19 22 34.7	10.760

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	SATURDAY 17.					MONDAY 19.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	21 32 41.69	1.9937	S. 19 22 34.7	10.760	0	23 5 1.37	1.8695	S. 9 21 46.4	13.938
1	21 34 41.21	1.9903	19 11 46.5	10.847	1	23 6 53.50	1.8681	9 7 48.8	13.982
2	21 36 40.53	1.9869	19 0 53.1	10.933	2	23 8 45.55	1.8668	8 53 48.5	14.026
3	21 38 39.64	1.9835	18 49 54.6	11.018	3	23 10 37.52	1.8656	8 39 45.6	14.069
4	21 40 38.55	1.9801	18 38 51.0	11.101	4	23 12 29.41	1.8644	8 25 40.1	14.111
5	21 42 37.26	1.9767	18 27 42.4	11.184	5	23 14 21.23	1.8632	8 11 32.1	14.153
6	21 44 35.77	1.9734	18 16 28.9	11.267	6	23 16 12.99	1.8621	7 57 21.7	14.193
7	21 46 34.08	1.9701	18 5 10.4	11.348	7	23 18 4.69	1.8611	7 43 8.9	14.232
8	21 48 32.20	1.9668	17 53 47.1	11.428	8	23 19 56.33	1.8601	7 28 53.8	14.271
9	21 50 30.12	1.9636	17 42 19.0	11.508	9	23 21 47.91	1.8591	7 14 36.4	14.309
10	21 52 27.85	1.9605	17 30 46.2	11.587	10	23 23 39.43	1.8582	7 0 16.7	14.346
11	21 54 25.39	1.9574	17 19 8.6	11.665	11	23 25 30.90	1.8575	6 45 54.9	14.382
12	21 56 22.74	1.9542	17 7 26.4	11.742	12	23 27 22.33	1.8569	6 31 31.0	14.417
13	21 58 19.90	1.9511	16 55 39.6	11.818	13	23 29 13.72	1.8562	6 17 5.0	14.451
14	22 0 16.87	1.9481	16 43 48.2	11.894	14	23 31 5.07	1.8556	6 2 37.0	14.484
15	22 2 13.66	1.9451	16 31 52.3	11.969	15	23 32 56.39	1.8551	5 48 7.0	14.516
16	22 4 10.27	1.9421	16 19 52.0	12.042	16	23 34 47.69	1.8546	5 33 35.1	14.547
17	22 6 6.70	1.9391	16 7 47.3	12.115	17	23 36 38.95	1.8542	5 19 1.3	14.577
18	22 8 2.96	1.9361	15 55 38.2	12.187	18	23 38 30.20	1.8539	5 4 25.8	14.607
19	22 9 59.04	1.9332	15 43 24.8	12.258	19	23 40 21.43	1.8537	4 49 48.5	14.636
20	22 11 54.95	1.9304	15 31 7.2	12.329	20	23 42 12.64	1.8535	4 35 9.6	14.663
21	22 13 50.69	1.9276	15 18 45.4	12.398	21	23 44 3.85	1.8534	4 20 29.0	14.689
22	22 15 46.26	1.9248	15 6 19.5	12.466	22	23 45 55.05	1.8534	4 5 46.8	14.715
23	22 17 41.67	1.9221	S. 14 53 49.5	12.533	23	23 47 46.25	1.8534	S. 3 51 3.1	14.740
	SUNDAY 18.					TUESDAY 20.			
0	22 19 36.91	1.9194	S. 14 41 15.5	12.600	0	23 49 37.46	1.8535	S. 3 36 18.0	14.764
1	22 21 31.99	1.9167	14 28 37.5	12.667	1	23 51 28.67	1.8537	3 21 31.4	14.787
2	22 23 26.92	1.9141	14 15 55.5	12.732	2	23 53 19.90	1.8539	3 6 43.5	14.809
3	22 25 21.69	1.9116	14 3 9.7	12.796	3	23 55 11.14	1.8542	2 51 54.3	14.830
4	22 27 16.31	1.9091	13 50 20.1	12.859	4	23 57 2.40	1.8546	2 37 3.8	14.850
5	22 29 10.78	1.9066	13 37 26.7	12.921	5	23 58 53.69	1.8550	2 22 12.1	14.870
6	22 31 5.11	1.9042	13 24 29.5	12.983	6	0 0 45.01	1.8554	2 7 19.3	14.889
7	22 32 59.29	1.9018	13 11 28.7	13.043	7	0 2 36.36	1.8560	1 52 25.4	14.906
8	22 34 53.33	1.8995	12 58 24.3	13.102	8	0 4 27.75	1.8568	1 37 30.5	14.922
9	22 36 47.23	1.8973	12 45 16.4	13.162	9	0 6 19.18	1.8576	1 22 34.7	14.938
10	22 38 41.00	1.8951	12 32 4.9	13.220	10	0 8 10.66	1.8584	1 7 38.0	14.953
11	22 40 34.64	1.8929	12 18 50.0	13.277	11	0 10 2.19	1.8593	0 52 40.4	14.967
12	22 42 28.15	1.8908	12 5 31.7	13.333	12	0 11 53.77	1.8603	0 37 42.0	14.980
13	22 44 21.53	1.8887	11 52 10.1	13.388	13	0 13 45.41	1.8613	0 22 42.8	14.992
14	22 46 14.79	1.8866	11 38 45.2	13.443	14	0 15 37.12	1.8624	S. 0 7 43.0	15.003
15	22 48 7.93	1.8847	11 25 17.0	13.496	15	0 17 28.90	1.8636	N. 0 7 17.4	15.013
16	22 50 0.95	1.8828	11 11 45.6	13.548	16	0 19 20.75	1.8648	0 22 18.4	15.022
17	22 51 53.86	1.8809	10 58 11.1	13.600	17	0 21 12.68	1.8661	0 37 20.0	15.030
18	22 53 46.66	1.8791	10 44 33.6	13.651	18	0 23 4.69	1.8676	0 52 22.0	15.037
19	22 55 39.36	1.8774	10 30 53.0	13.701	19	0 24 56.79	1.8691	1 7 24.4	15.043
20	22 57 31.95	1.8758	10 17 9.4	13.750	20	0 26 48.98	1.8706	1 22 27.2	15.048
21	22 59 24.45	1.8742	10 3 22.9	13.798	21	0 28 41.27	1.8723	1 37 30.2	15.052
22	23 1 16.85	1.8726	9 49 33.5	13.846	22	0 30 33.66	1.8741	1 52 33.4	15.055
23	23 3 9.15	1.8710	9 35 41.3	13.893	23	0 32 26.15	1.8759	2 7 36.8	15.057
24	23 5 1.37	1.8695	S. 9 21 46.4	13.938	24	0 34 18.76	1.8777	N. 2 22 40.3	15.058

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	WEDNESDAY 21.					FRIDAY 23.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	0 34 18.76	1.8777	N. 2 22 40.3	15.058	0	2 8 7.76	2.0624	N. 14 6 35.4	13.829
1	0 36 11.48	1.8796	2 37 43.8	15.058	1	2 10 11.68	2.0683	14 20 23.5	13.773
2	0 38 4.32	1.8817	2 52 47.3	15.058	2	2 12 15.95	2.0741	14 34 8.2	13.716
3	0 39 57.28	1.8838	3 7 50.8	15.057	3	2 14 20.57	2.0800	14 47 49.4	13.658
4	0 41 50.37	1.8859	3 22 54.1	15.054	4	2 16 25.56	2.0861	15 1 27.1	13.598
5	0 43 43.60	1.8882	3 37 57.2	15.050	5	2 18 30.91	2.0923	15 15 1.1	13.537
6	0 45 36.97	1.8906	3 53 0.0	15.045	6	2 20 36.63	2.0985	15 28 31.5	13.474
7	0 47 30.48	1.8930	4 8 2.5	15.039	7	2 22 42.73	2.1047	15 41 58.1	13.410
8	0 49 24.13	1.8955	4 23 4.6	15.031	8	2 24 49.20	2.1110	15 55 20.8	13.345
9	0 51 17.94	1.8981	4 38 6.3	15.023	9	2 26 56.05	2.1174	16 8 39.5	13.278
10	0 53 11.91	1.9008	4 53 7.5	15.015	10	2 29 3.29	2.1239	16 21 54.2	13.210
11	0 55 6.04	1.9036	5 8 8.1	15.005	11	2 31 10.92	2.1305	16 35 4.7	13.141
12	0 57 0.34	1.9064	5 23 8.0	14.994	12	2 33 18.95	2.1371	16 48 11.0	13.068
13	0 58 54.81	1.9093	5 38 7.2	14.981	13	2 35 27.38	2.1438	17 1 13.0	12.995
14	1 0 49.46	1.9123	5 53 5.7	14.967	14	2 37 36.20	2.1505	17 14 10.6	12.922
15	1 2 44.29	1.9154	6 8 3.3	14.953	15	2 39 45.43	2.1573	17 27 3.6	12.846
16	1 4 39.31	1.9186	6 23 0.1	14.938	16	2 41 55.07	2.1642	17 39 52.0	12.769
17	1 6 34.52	1.9218	6 37 55.9	14.921	17	2 44 5.13	2.1711	17 52 35.8	12.690
18	1 8 29.92	1.9251	6 52 50.6	14.903	18	2 46 15.61	2.1781	18 5 14.8	12.610
19	1 10 25.52	1.9285	7 7 44.3	14.885	19	2 48 26.51	2.1851	18 17 49.0	12.528
20	1 12 21.33	1.9320	7 22 36.9	14.866	20	2 50 37.83	2.1922	18 30 18.2	12.444
21	1 14 17.35	1.9356	7 37 28.2	14.845	21	2 52 49.57	2.1994	18 42 42.3	12.359
22	1 16 13.59	1.9392	7 52 18.2	14.823	22	2 55 1.75	2.2066	18 55 1.3	12.273
23	1 18 10.05	1.9429	N. 8 7 6.9	14.800	23	2 57 14.37	2.2139	N. 19 7 15.1	12.185
	THURSDAY 22.					SATURDAY 24.			
0	1 20 6.74	1.9467	N. 8 21 54.2	14.775	0	2 59 27.42	2.2212	N. 19 19 23.5	12.095
1	1 22 3.66	1.9506	8 36 40.0	14.749	1	3 1 40.91	2.2285	19 31 26.5	12.004
2	1 24 0.81	1.9546	8 51 24.1	14.723	2	3 3 54.84	2.2359	19 43 24.0	11.911
3	1 25 58.21	1.9586	9 6 6.7	14.696	3	3 6 9.22	2.2434	19 55 15.8	11.816
4	1 27 55.85	1.9627	9 20 47.6	14.667	4	3 8 24.05	2.2509	20 7 1.9	11.720
5	1 29 53.74	1.9669	9 35 26.7	14.636	5	3 10 39.33	2.2584	20 18 42.2	11.622
6	1 31 51.89	1.9712	9 50 4.0	14.605	6	3 12 55.07	2.2660	20 30 16.6	11.522
7	1 33 50.29	1.9756	10 4 39.3	14.573	7	3 15 11.26	2.2737	20 41 44.9	11.421
8	1 35 48.96	1.9801	10 19 12.6	14.539	8	3 17 27.91	2.2814	20 53 7.1	11.318
9	1 37 47.91	1.9847	10 33 43.9	14.504	9	3 19 45.02	2.2891	21 4 23.1	11.214
10	1 39 47.12	1.9893	10 48 13.1	14.468	10	3 22 2.60	2.2968	21 15 32.8	11.108
11	1 41 46.62	1.9940	11 2 40.1	14.431	11	3 24 20.64	2.3045	21 26 36.1	11.000
12	1 43 46.40	1.9988	11 17 4.8	14.392	12	3 26 39.15	2.3123	21 37 32.8	10.890
13	1 45 46.47	2.0037	11 31 27.1	14.352	13	3 28 58.12	2.3201	21 48 22.9	10.778
14	1 47 46.84	2.0087	11 45 47.0	14.311	14	3 31 17.57	2.3279	21 59 6.3	10.665
15	1 49 47.51	2.0137	12 0 4.4	14.268	15	3 33 37.49	2.3358	22 9 42.8	10.551
16	1 51 48.48	2.0188	12 14 19.2	14.224	16	3 35 57.88	2.3437	22 20 12.4	10.435
17	1 53 49.76	2.0240	12 28 31.3	14.179	17	3 38 18.74	2.3516	22 30 34.9	10.317
18	1 55 51.36	2.0292	12 42 40.7	14.133	18	3 40 40.07	2.3596	22 40 50.3	10.197
19	1 57 53.27	2.0345	12 56 47.3	14.086	19	3 43 1.88	2.3675	22 50 58.5	10.075
20	1 59 55.50	2.0399	13 10 51.0	14.037	20	3 45 24.17	2.3754	23 0 59.4	9.952
21	2 1 58.06	2.0454	13 24 51.8	13.987	21	3 47 46.93	2.3833	23 10 52.8	9.827
22	2 4 0.95	2.0510	13 38 49.5	13.936	22	3 50 10.16	2.3912	23 20 38.6	9.700
23	2 6 4.18	2.0566	13 52 44.0	13.883	23	3 52 33.87	2.3991	23 30 16.8	9.571
24	2 8 7.76	2.0624	N. 14 6 35.4	13.829	24	3 54 58.06	2.4070	N. 23 39 47.2	9.441

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	SUNDAY 25.					TUESDAY 27.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	3 54 58.06	2.4070	N.23 39 47.2	9.441	0	5 58 38.67	2.7086	N.28 11 42.5	1.331
1	3 57 22.72	2.4149	23 49 9.7	9.310	1	6 1 21.29	2.7118	28 12 56.4	1.132
2	3 59 47.85	2.4228	23 58 24.3	9.176	2	6 4 4.09	2.7148	28 13 58.3	0.932
3	4 2 13.46	2.4307	24 7 30.8	9.040	3	6 6 47.07	2.7176	28 14 48.2	0.731
4	4 4 39.54	2.4385	24 16 29.1	8.903	4	6 9 30.21	2.7203	28 15 26.0	0.529
5	4 7 6.09	2.4464	24 25 19.1	8.764	5	6 12 13.50	2.7227	28 15 51.7	0.327
6	4 9 33.11	2.4542	24 34 0.8	8.624	6	6 14 56.93	2.7249	28 16 5.3	+0.125
7	4 12 0.59	2.4619	24 42 34.0	8.482	7	6 17 40.49	2.7270	28 16 6.7	−0.078
8	4 14 28.54	2.4697	24 50 58.6	8.338	8	6 20 24.17	2.7289	28 15 55.9	0.282
9	4 16 56.95	2.4774	24 59 14.5	8.192	9	6 23 7.96	2.7306	28 15 32.9	0.486
10	4 19 25.83	2.4851	25 7 21.6	8.044	10	6 25 51.84	2.7321	28 14 57.6	0.689
11	4 21 55.16	2.4927	25 15 19.8	7.895	11	6 28 35.81	2.7333	28 14 10.1	0.893
12	4 24 24.95	2.5002	25 23 9.0	7.744	12	6 31 19.85	2.7344	28 13 10.3	1.099
13	4 26 55.19	2.5078	25 30 49.2	7.592	13	6 34 3.94	2.7354	28 11 58.2	1.304
14	4 29 25.88	2.5153	25 38 20.2	7.438	14	6 36 48.08	2.7361	28 10 33.8	1.509
15	4 31 57.02	2.5227	25 45 41.8	7.282	15	6 39 32.27	2.7366	28 8 57.1	1.715
16	4 34 28.60	2.5300	25 52 54.0	7.126	16	6 42 16.48	2.7369	28 7 8.1	1.920
17	4 37 0.62	2.5373	25 59 56.7	6.967	17	6 45 0.70	2.7370	28 5 6.8	2.125
18	4 39 33.07	2.5445	26 6 49.8	6.805	18	6 47 44.92	2.7370	28 2 53.1	2.330
19	4 42 5.96	2.5516	26 13 33.3	6.642	19	6 50 29.14	2.7368	28 0 27.1	2.535
20	4 44 39.27	2.5587	26 20 6.9	6.478	20	6 53 13.34	2.7363	27 57 48.8	2.740
21	4 47 13.00	2.5657	26 26 30.6	6.313	21	6 55 57.50	2.7357	27 54 58.3	2.945
22	4 49 47.14	2.5726	26 32 44.4	6.146	22	6 58 41.62	2.7349	27 51 55.5	3.150
23	4 52 21.70	2.5793	N.26 38 48.1	5.977	23	7 1 25.69	2.7339	N.27 48 40.4	3.354
	MONDAY 26.					WEDNESDAY 28.			
0	4 54 56.66	2.5860	N.26 44 41.7	5.807	0	7 4 9.69	2.7327	N.27 45 13.0	3.558
1	4 57 32.02	2.5926	26 50 25.0	5.636	1	7 6 53.61	2.7313	27 41 33.4	3.762
2	5 0 7.77	2.5991	26 55 57.9	5.462	2	7 9 37.45	2.7298	27 37 41.6	3.965
3	5 2 43.91	2.6055	27 1 20.4	5.287	3	7 12 21.19	2.7280	27 33 37.6	4.167
4	5 5 20.43	2.6117	27 6 32.4	5.112	4	7 15 4.81	2.7260	27 29 21.5	4.369
5	5 7 57.33	2.6179	27 11 33.7	4.934	5	7 17 48.31	2.7239	27 24 53.3	4.571
6	5 10 34.59	2.6240	27 16 24.4	4.755	6	7 20 31.68	2.7216	27 20 13.0	4.772
7	5 13 12.21	2.6299	27 21 4.3	4.575	7	7 23 14.91	2.7190	27 15 20.6	4.972
8	5 15 50.18	2.6356	27 25 33.3	4.393	8	7 25 57.98	2.7164	27 10 16.3	5.172
9	5 18 28.49	2.6413	27 29 51.4	4.210	9	7 28 40.89	2.7137	27 5 0.0	5.371
10	5 21 7.14	2.6469	27 33 58.5	4.026	10	7 31 23.62	2.7107	26 59 31.8	5.569
11	5 23 46.12	2.6523	27 37 54.5	3.841	11	7 34 6.17	2.7075	26 53 51.7	5.766
12	5 26 25.42	2.6576	27 41 39.4	3.654	12	7 36 48.52	2.7041	26 47 59.9	5.962
13	5 29 5.03	2.6627	27 45 13.0	3.466	13	7 39 30.67	2.7007	26 41 56.3	6.158
14	5 31 44.94	2.6677	27 48 35.3	3.277	14	7 42 12.61	2.6971	26 35 41.0	6.352
15	5 34 25.15	2.6725	27 51 46.3	3.087	15	7 44 54.32	2.6933	26 29 14.0	6.545
16	5 37 5.64	2.6771	27 54 45.8	2.896	16	7 47 35.80	2.6894	26 22 35.5	6.738
17	5 39 46.41	2.6816	27 57 33.8	2.704	17	7 50 17.04	2.6853	26 15 45.5	6.929
18	5 42 27.44	2.6860	28 0 10.2	2.511	18	7 52 58.03	2.6810	26 8 44.1	7.119
19	5 45 8.73	2.6902	28 2 35.0	2.316	19	7 55 38.76	2.6766	26 1 31.3	7.308
20	5 47 50.26	2.6942	28 4 48.1	2.120	20	7 58 19.23	2.6721	25 54 7.3	7.495
21	5 50 32.03	2.6981	28 6 49.4	1.924	21	8 0 59.42	2.6675	25 46 32.0	7.681
22	5 53 14.03	2.7018	28 8 39.0	1.727	22	8 3 39.33	2.6628	25 38 45.5	7.866
23	5 55 56.25	2.7053	28 10 16.7	1.529	23	8 6 18.95	2.6579	25 30 48.0	8.049
24	5 58 38.67	2.7086	N.28 11 42.5	1.331	24	8 8 58.27	2.6528	N.25 22 39.6	8.231

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	THURSDAY 29.			
	h m s	s	° ′ ″	″
0	8 8 58.27	2.6528	N.25 22 39.6	8.231
1	8 11 37.28	2.6476	25 14 20.3	8.412
2	8 14 15.99	2.6423	25 5 50.1	8.592
3	8 16 54.37	2.6369	24 57 9.2	8.770
4	8 19 32.42	2.6315	24 48 17.7	8.946
5	8 22 10.15	2.6259	24 39 15.7	9.121
6	8 24 47.53	2.6202	24 30 3.3	9.294
7	8 27 24.57	2.6145	24 20 40.5	9.465
8	8 30 1.26	2.6086	24 11 7.4	9.635
9	8 32 37.60	2.6026	24 1 24.2	9.804
10	8 35 13.57	2.5965	23 51 31.0	9.971
11	8 37 49.18	2.5903	23 41 27.8	10.136
12	8 40 24.42	2.5841	23 31 14.8	10.299
13	8 42 59.28	2.5779	23 20 52.1	10.460
14	8 45 33.76	2.5716	23 10 19.7	10.619
15	8 48 7.86	2.5651	22 59 37.8	10.776
16	8 50 41.58	2.5586	22 48 46.5	10.932
17	8 53 14.90	2.5521	22 37 45.9	11.086
18	8 55 47.83	2.5455	22 26 36.2	11.238
19	8 58 20.36	2.5389	22 15 17.4	11.389
20	9 0 52.50	2.5322	22 3 49.6	11.537
21	9 3 24.23	2.5255	21 52 12.9	11.683
22	9 5 55.55	2.5188	21 40 27.6	11.828
23	9 8 26.48	2.5120	N.21 28 33.6	11.970

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	FRIDAY, MARCH 1.			
	h m s	s	° ′ ″	″
0	9 10 56.99	2.5052	N.21 16 31.2	12.110

PHASES OF THE MOON.

			d	h	m
○	Full Moon . . .	Feb.	2	11	58.0
☾	Last Quarter		9	12	50.8
●	New Moon		17	17	44.2
☽	First Quarter		25	7	26.8

			d	h
☾	Perigee	Feb.	1	14.1
☾	Apogee		13	23.1
☾	Perigee		29	21.1

AT GREENWICH APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S					Sidereal Time of Semidiameter Passing Meridian.	Equation of Time, to be Added to Apparent Time.	Diff. for 1 Hour.
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.	Semidiameter.			
		h m s	s	° ′ ″	″	′ ″	s	m s	s
Frid.	1	22 48 16.50	9.362	S. 7 36 27.8	+56.95	16 10.05	65.40	12 33.49	0.493
Sat.	2	22 52 0.92	9.340	7 13 38.0	57.20	16 9.81	65.33	12 21.39	0.514
SUN.	3	22 55 44.84	9.320	6 50 42.1	57.45	16 9.57	65.26	12 8.79	0.535
Mon.	4	22 59 28.28	9.301	6 27 40.5	+57.68	16 9.32	65.20	11 55.72	0.554
Tues.	5	23 3 11.28	9.282	6 4 33.5	57.90	16 9.07	65.14	11 42.20	0.572
Wed.	6	23 6 53.85	9.265	5 41 21.5	58.10	16 8.81	65.08	11 28.26	0.589
Thur.	7	23 10 36.01	9.249	5 18 4.9	+58.29	16 8.55	65.02	11 13.91	0.605
Frid.	8	23 14 17.80	9.233	4 54 43 9	58.46	16 8.29	64.96	10 59.18	0.621
Sat.	9	23 17 59.22	9.218	4 31 19.0	58.62	16 8.02	64.91	10 44.09	0.636
SUN.	10	23 21 40.30	9.205	4 7 50.5	+58.76	16 7.76	64.85	10 28.65	0.650
Mon.	11	23 25 21.06	9.192	3 44 18.8	58.88	16 7.49	64.80	10 12.90	0.663
Tues.	12	23 29 1.51	9.180	3 20 44.4	58.99	16 7.22	64.75	9 56.84	0.675
Wed.	13	23 32 41.68	9.168	2 57 7.6	+59.08	16 6.95	64.71	9 40.50	0.686
Thur.	14	23 36 21.59	9.158	2 33 28.6	59.16	16 6.68	64.67	9 23.89	0.697
Frid.	15	23 40 1.25	9.148	2 9 48.0	59.22	16 6.41	64.63	9 7.04	0.707
Sat.	16	23 43 40.68	9.139	1 46 6.1	+59.26	16 6.14	64.60	8 49.97	0.716
SUN.	17	23 47 19.90	9.131	1 22 23.4	59.29	16 5.87	64.57	8 32.69	0.725
Mon.	18	23 50 58.93	9.123	0 58 40.1	59.30	16 5.60	64.54	8 15.22	0.732
Tues.	19	23 54 37.79	9.116	0 34 56.6	+59.29	16 5.33	64.52	7 57.58	0.739
Wed.	20	23 58 16.50	9.110	S. 0 11 13.5	59.28	16 5.06	64.50	7 39.78	0.745
Thur.	21	0 1 55.06	9.104	N. 0 12 28.9	59.25	16 4.79	64.48	7 21.83	0.750
Frid.	22	0 5 33.50	9.099	0 36 10.3	+59.20	16 4.53	64.46	7 3.76	0.755
Sat.	23	0 9 11.83	9.095	0 59 50.2	59.13	16 4.26	64.45	6 45.59	0.759
SUN.	24	0 12 50.08	9.092	1 23 28.3	59.04	16 3.99	64.44	6 27.33	0.762
Mon.	25	0 16 28.26	9.090	1 47 4.2	+58.94	16 3.72	64.44	6 9.01	0.764
Tues.	26	0 20 6.40	9.089	2 10 37.5	58.83	16 3.45	64.43	5 50.64	0.766
Wed.	27	0 23 44.50	9.089	2 34 7.9	58.70	16 3.17	64.43	5 32.23	0.767
Thur.	28	0 27 22.58	9.090	2 57 35.0	+58.55	16 2.90	64.43	5 13.82	0.767
Frid.	29	0 31 0.68	9.090	3 20 58.5	58.39	16 2.62	64.44	4 55.42	0.766
Sat.	30	0 34 38.81	9.091	3 44 18.0	58.22	16 2.35	64.45	4 37.05	0.764
SUN.	31	0 38 17.00	9.093	4 7 33.2	58.04	16 2.07	64.46	4 18.74	0.761
Mon.	32	0 41 55.28	9.097	N. 4 30 43.9	+57.84	16 1.80	64.48	4 0.51	0.758

Note.—The mean time of semidiameter passing may be found by subtracting $0^s.18$ from the sidereal time.

The sign + prefixed to the hourly change of declination indicates that south declinations are decreasing; north declinations increasing.

AT GREENWICH MEAN NOON.

Day of the Week.	Day of the Month.	THE SUN'S				Equation of Time, to be Subtracted from Mean Time.	Diff. for 1 Hour.	Sidereal Time, or Right Ascension of Mean Sun.
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.			
		h m s	s	° ′ ″	″	m s	s	h m s
Frid.	1	22 48 14.54	9.363	S. 7 36 39.7	+56.95	12 33.59	0.493	22 35 40.94
Sat.	2	22 51 58.99	9.342	7 13 49.8	57.20	12 21.49	0.514	22 39 37.50
SUN.	3	22 55 42.95	9.322	6 50 53.8	57.45	12 8.90	0.535	22 43 34.05
Mon.	4	22 59 26.43	9.303	6 27 52.0	+57.68	11 55.83	0.554	22 47 30.61
Tues.	5	23 3 9.47	9.284	6 4 44.8	57.90	11 42.31	0.572	22 51 27.16
Wed.	6	23 6 52.08	9.267	5 41 32.6	58.10	11 28.37	0.589	22 55 23.71
Thur.	7	23 10 34.29	9.251	5 18 15.8	+58.29	11 14.02	0.606	22 59 20.27
Frid.	8	23 14 16.11	9.235	4 54 54.6	58.46	10 59.29	0.621	23 3 16.82
Sat.	9	23 17 57.57	9.220	4 31 29.5	58.62	10 44.20	0.636	23 7 13.37
SUN.	10	23 21 38.69	9.207	4 8 0.8	+58.76	10 28.77	0.650	23 11 9.93
Mon.	11	23 25 19.49	9.194	3 44 28.9	58.89	10 13.01	0.663	23 15 6.48
Tues.	12	23 28 59.99	9.182	3 20 54.2	59.00	9 56.95	0.675	23 19 3.04
Wed.	13	23 32 40.20	9.170	2 57 17.1	+59.09	9 40.61	0.686	23 22 59.60
Thur.	14	23 36 20.15	9.160	2 33 37.9	59.17	9 24.00	0.697	23 26 56.15
Frid.	15	23 39 59.85	9.150	2 9 57.0	59.23	9 7.15	0.707	23 30 52.70
Sat.	16	23 43 39.33	9.141	1 46 14.8	+59.28	8 50.08	0.716	23 34 49.25
SUN.	17	23 47 18.60	9.132	1 22 31.8	59.31	8 32.80	0.724	23 38 45.80
Mon.	18	23 50 57.68	9.125	0 58 48.2	59.32	8 15.32	0.732	23 42 42.36
Tues.	19	23 54 36.58	9.118	0 35 4.5	+59.31	7 57.67	0.739	23 46 38.91
Wed.	20	23 58 15.33	9.112	S. 0 11 21.1	59.29	7 39.87	0.745	23 50 35.46
Thur.	21	0 1 53.94	9.106	N. 0 12 21.6	59.26	7 21.93	0.750	23 54 32.02
Frid.	22	0 5 32.43	9.101	0 36 3.3	+59.21	7 3.86	0.755	23 58 28.57
Sat.	23	0 9 10.81	9.097	0 59 43.6	59.14	6 45.68	0.759	0 2 25.13
SUN.	24	0 12 49.10	9.094	1 23 22.0	59.05	6 27.42	0.762	0 6 21.68
Mon.	25	0 16 27.32	9.092	1 46 58.2	+58.95	6 9.09	0.765	0 10 18.23
Tues.	26	0 20 5.49	9.090	2 10 31.8	58.84	5 50.71	0.766	0 14 14.79
Wed.	27	0 23 43.64	9.089	2 34 2.5	58.71	5 32.30	0.767	0 18 11.34
Thur.	28	0 27 21.78	9.089	2 57 29.9	+58.57	5 13.88	0.767	0 22 7.89
Frid.	29	0 30 59.93	9.090	3 20 53.7	58.41	4 55.47	0.766	0 26 4.45
Sat.	30	0 34 38.11	9.092	3 44 13.5	58.24	4 37.10	0.764	0 30 1.00
SUN.	31	0 38 16.35	9.095	4 7 29.0	58.06	4 18.79	0.761	0 33 57.56
Mon.	32	0 41 54.67	9.099	N. 4 30 40.0	+57.86	4 0.56	0.758	0 37 54.11

NOTE.—The semidiameter for mean noon may be assumed the same as that for apparent noon. The sign + prefixed to the hourly change of declination indicates that south declinations are decreasing; north declinations increasing.

Diff. for 1 Hour,
+9^{s}.8565.
(Table III.)

AT GREENWICH MEAN NOON.

Day of the Month.	Day of the Year.	THE SUN'S						Mean Time of Sidereal Noon.
		True Longitude.		Diff. for 1 Hour.	Latitude.	Logarithm of the Radius Vector of the Earth.	Diff. for 1 Hour.	
		λ	λ'					
		° ′ ″	′ ″	″	″			h m s
1	61	340 34 3.2	34 0.9	150.40	+0.50	9.996 1540	+44.6	1 24 5.24
2	62	341 34 11.9	34 9.5	150.32	0.44	9.996 2620	45.3	1 20 9.33
3	63	342 34 18.7	34 16.2	150.25	0.33	9.996 3717	46.1	1 16 13.43
4	64	343 34 23.7	34 21.1	150.17	+0.21	9.996 4831	+46.8	1 12 17.52
5	65	344 34 26.9	34 24.2	150.10	+0.08	9.996 5962	47.4	1 8 21.61
6	66	345 34 28.4	34 25.6	150.03	−0.06	9.996 7108	48.0	1 4 25.70
7	67	346 34 28.2	34 25.3	149.96	−0.19	9.996 8268	+48.6	1 0 29.80
8	68	347 34 26.4	34 23.3	149.89	0.32	9.996 9440	49.1	0 56 33.89
9	69	348 34 22.9	34 19.7	149.82	0.44	9.997 0623	49.5	0 52 37.98
10	70	349 34 17.7	34 14.4	149.75	−0.54	9.997 1816	+49.9	0 48 42.07
11	71	350 34 10.8	34 7.4	149.68	0.61	9.997 3017	50.2	0 44 46.16
12	72	351 34 2.3	33 58.7	149.61	0.66	9.997 4225	50.4	0 40 50.26
13	73	352 33 52.1	33 48.4	149.54	−0.67	9.997 5438	+50.6	0 36 54.35
14	74	353 33 40.1	33 36.3	149.47	0.67	9.997 6655	50.8	0 32 58.44
15	75	354 33 26.3	33 22.4	149.39	0.63	9.997 7875	50.9	0 29 2.53
16	76	355 33 10.7	33 6.7	149.31	−0.57	9.997 9097	+50.9	0 25 6.62
17	77	356 32 53.2	32 49.2	149.23	0.48	9.998 0320	50.9	0 21 10.72
18	78	357 32 33.8	32 29.7	149.15	0.38	9.998 1543	50.9	0 17 14.81
19	79	358 32 12.5	32 8.2	149.07	−0.27	9.998 2764	+50.9	0 13 18.90
20	80	359 31 49.1	31 44.7	148.98	0.14	9.998 3984	50.9	0 9 22.99
21	81	0 31 23.6	31 19.1	148.89	−0.01	9.998 5203	50.8	0 5 27.09
22	82	1 30 55.9	30 51.3	148.80	+0.12	9.998 6420	+50.7	0 1 31.18 23 57 35.27
23	83	2 30 26.0	30 21.2	148.70	0.25	9.998 7636	50.7	23 53 39.36
24	84	3 29 53.8	29 48.8	148.61	0.34	9.998 8851	50.6	23 49 43.45
25	85	4 29 19.2	29 14.1	148.51	+0.41	9.999 0067	+50.7	23 45 47.55
26	86	5 28 42.2	28 37.1	148.42	0.44	9.999 1284	50.8	23 41 51.64
27	87	6 28 2.9	27 57.7	148.32	0.45	9.999 2503	50.9	23 37 55.73
28	88	7 27 21.2	27 16.0	148.22	+0.42	9.999 3726	+51.1	23 33 59.82
29	89	8 26 37.3	26 31.9	148.12	0.35	9.999 4954	51.3	23 30 3.91
30	90	9 25 51.1	25 45.5	148.03	0.26	9.999 6187	51.5	23 26 8.01
31	91	10 25 2.6	24 57.0	147.94	0.15	9.999 7426	51.7	23 22 12.10
32	92	11 24 12.0	24 6.3	147.85	+0.02	9.999 8671	+52.0	23 18 16.19

NOTE.—The longitudes in the column λ are referred to the true equinox of their own date, while those in the column λ' are referred to the mean equinox of the beginning of the Besselian fictitious year.

Diff. for 1 Hour, −9ˢ.8296. (Table II.)

GREENWICH MEAN TIME.

Day of the Month.	THE MOON'S								
	SEMIDIAMETER.		HORIZONTAL PARALLAX.				UPPER TRANSIT.		AGE.
	Noon.	Midnight.	Noon.	Diff. for 1 Hour.	Midnight.	Diff. for 1 Hour.	Meridian of Greenwich.	Diff. for 1 Hour.	Noon.
	′ ″	′ ″	′ ″	″	′ ″	″	h m	m	d
1	16 30.2	16 29.5	60 28.3	−0.08	60 25.5	−0.39	11 0.6	2.35	12.3
2	16 27.7	16 24.8	60 18.9	0.71	60 8.5	1.02	11 54.9	2.18	13.3
3	16 21.0	16 16.3	59 54.5	1.30	59 37.3	1.55	12 45.5	2.04	14.3
4	16 10.9	16 4.8	59 17.3	−1.77	58 54.9	−1.94	13 33.4	1.96	15.3
5	15 58.2	15 51.2	58 30.7	2.07	58 5.2	2.15	14 20.0	1.93	16.3
6	15 44.1	15 37.0	57 39.1	2.18	57 13.0	2.16	15 6.4	1.95	17.3
7	15 30.0	15 23.3	56 47.3	−2.10	56 22.6	−2.00	15 53.6	1.99	18.3
8	15 16.9	15 11.0	55 59.2	1.88	55 37.5	1.73	16 42.2	2.06	19.3
9	15 5.6	15 0.8	55 17.8	1.55	55 0.3	1.36	17 32.4	2.12	20.3
10	14 56.7	14 53.3	54 45.2	−1.15	54 32.6	−0.94	18 23.8	2.15	21.3
11	14 50.6	14 48.6	54 22.7	0.72	54 15.3	0.51	19 15.5	2.15	22.3
12	14 47.3	14 46.7	54 10.5	−0.29	54 8.3	−0.08	20 6.5	2.10	23.3
13	14 46.7	14 47.4	54 8.5	+0.11	54 11.0	+0.30	20 55.8	2.01	24.3
14	14 48.7	14 50.6	54 15.8	0.48	54 22.6	0.64	21 43.0	1.92	25.3
15	14 52.9	14 55.7	54 31.2	0.79	54 41.5	0.92	22 28.1	1.84	26.3
16	14 58.9	15 2.4	54 53.2	+1.03	55 6.1	+1.12	23 11.5	1.78	27.3
17	15 6.2	15 10.2	55 20.0	1.19	55 34.6	1.24	23 54.0	1.76	28.3
18	15 14.3	15 18.6	55 49.8	1.27	56 5.3	1.29	6	. .	29.3
19	15 22.8	15 27.0	56 20.8	+1.29	56 36.3	+1.28	0 36.4	1.78	0.6
20	15 31.2	15 35.3	56 51.6	1.27	57 6.7	1.24	1 19.8	1.85	1.6
21	15 39.3	15 43.1	57 21.3	1.20	57 35.4	1.15	2 5.5	1.97	2.6
22	15 46.8	15 50.4	57 49.0	+1.11	58 2.1	+1.07	2 54.7	2.13	3.6
23	15 53.8	15 57.0	58 14.6	1.02	58 26.5	0.97	3 48.0	2.32	4.6
24	16 0.1	16 3.0	58 37.8	0.91	58 48.4	0.85	4 45.8	2.50	5.6
25	16 5.7	16 8.2	58 58.3	+0.79	59 7.3	+0.71	5 47.2	2.60	6.6
26	16 10.4	16 12.2	59 15.3	0.62	59 22.2	0.52	6 49.9	2.60	7.6
27	16 13.7	16 14.9	59 27.8	0.40	59 31.9	+0.27	7 51.4	2.50	8.6
28	16 15.6	16 15.7	59 34.4	+0.12	59 34.9	−0.05	8 49.7	2.35	9.6
29	16 15.2	16 14.2	59 33.3	−0.23	59 29.4	0.42	9 43.9	2.18	10.6
30	16 12.5	16 10.1	59 23.2	0.62	59 14.5	0.82	10 34.5	2.05	11.6
31	16 7.1	16 3.5	59 3.4	1.02	58 50.0	1.20	11 22.5	1.96	12.6
32	15 59.3	15 54.6	58 34.6	−1.36	58 17.3	−1.51	12 9.2	1.93	13.6

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	FRIDAY 1.					SUNDAY 3.			
	h m s	s	° ' "	"		h m s	s	° ' "	"
0	9 10 56.99	2.5052	N.21 16 31.2	12.110	0	11 3 28.99	2.1983	N. 9 33 5.4	16.398
1	9 13 27.09	2.4983	21 4 20.4	12.248	1	11 5 40.74	2.1932	9 16 40.3	16.437
2	9 15 56.78	2.4914	20 52 1.4	12.384	2	11 7 52.19	2.1882	9 0 13.0	16.474
3	9 18 26.06	2.4845	20 39 34.3	12.519	3	11 10 3.33	2.1833	8 43 43.5	16.509
4	9 20 54.92	2.4776	20 26 59.2	12.651	4	11 12 14.17	2.1784	8 27 11.9	16.543
5	9 23 23.37	2.4707	20 14 16.2	12.781	5	11 14 24.73	2.1736	8 10 38.4	16.575
6	9 25 51.40	2.4637	20 1 25.4	12.909	6	11 16 35.00	2.1689	7 54 3.0	16.604
7	9 28 19.02	2.4568	19 48 27.0	13.035	7	11 18 44.99	2.1643	7 37 25.9	16.632
8	9 30 46.22	2.4499	19 35 21.1	13.159	8	11 20 54.71	2.1597	7 20 47.1	16.658
9	9 33 13.00	2.4429	19 22 7.9	13.281	9	11 23 4.15	2.1552	7 4 7.0	16.682
10	9 35 39.37	2.4359	19 8 47.4	13.401	10	11 25 13.33	2.1508	6 47 25.3	16.704
11	9 38 5.32	2.4290	18 55 19.8	13.518	11	11 27 22.25	2.1465	6 30 42.4	16.724
12	9 40 30.85	2.4221	18 41 45.2	13.634	12	11 29 30.91	2.1423	6 13 58.4	16.743
13	9 42 55.97	2.4152	18 28 3.7	13.748	13	11 31 39.32	2.1381	5 57 13.3	16.760
14	9 45 20.67	2.4083	18 14 15.4	13.859	14	11 33 47.48	2.1340	5 40 27.2	16.775
15	9 47 44.96	2.4014	18 0 20.5	13.968	15	11 35 55.40	2.1300	5 23 40.3	16.788
16	9 50 8.84	2.3945	17 46 19.1	14.075	16	11 38 3.08	2.1261	5 6 52.6	16.800
17	9 52 32.30	2.3876	17 32 11.4	14.180	17	11 40 10.53	2.1223	4 50 4.3	16.810
18	9 54 55.35	2.3808	17 17 57.5	14.283	18	11 42 17.76	2.1185	4 33 15.4	16.818
19	9 57 18.00	2.3741	17 3 37.5	14.384	19	11 44 24.76	2.1148	4 16 26.1	16.825
20	9 59 40.24	2.3674	16 49 11.4	14.483	20	11 46 31.54	2.1113	3 59 36.5	16.830
21	10 2 2.08	2.3606	16 34 39.5	14.580	21	11 48 38.11	2.1078	3 42 46.6	16.833
22	10 4 23.52	2.3539	16 20 1.9	14.674	22	11 50 44.47	2.1043	3 25 56.6	16.834
23	10 6 44.55	2.3473	N.16 5 18.7	14.766	23	11 52 50.64	2.1010	N. 3 9 6.5	16.834
	SATURDAY 2.					MONDAY 4.			
0	10 9 5.19	2.3407	N.15 50 30.0	14.857	0	11 54 56.60	2.0978	N. 2 52 16.5	16.832
1	10 11 25.43	2.3341	15 35 35.9	14.945	1	11 57 2.37	2.0946	2 35 26.7	16.828
2	10 13 45.28	2.3276	15 20 36.6	15.030	2	11 59 7.96	2.0915	2 18 37.1	16.823
3	10 16 4.74	2.3211	15 5 32.3	15.114	3	12 1 13.36	2.0885	2 1 47.9	16.816
4	10 18 23.81	2.3146	14 50 23.0	15.196	4	12 3 18.58	2.0856	1 44 59.2	16.808
5	10 20 42.49	2.3082	14 35 8.8	15.275	5	12 5 23.63	2.0828	1 28 11.0	16.798
6	10 23 0.79	2.3019	14 19 49.9	15.353	6	12 7 28.52	2.0800	1 11 23.5	16.786
7	10 25 18.72	2.2957	14 4 26.5	15.429	7	12 9 33.23	2.0773	0 54 36.7	16.773
8	10 27 36.27	2.2895	13 48 58.6	15.502	8	12 11 37.80	2.0747	0 37 50.7	16.759
9	10 29 53.45	2.2833	13 33 26.3	15.573	9	12 13 42.20	2.0722	0 21 5.6	16.743
10	10 32 10.26	2.2771	13 17 49.8	15.642	10	12 15 46.46	2.0698	N. 0 4 21.6	16.725
11	10 34 26.70	2.2710	13 2 9.3	15.709	11	12 17 50.58	2.0675	S. 0 12 21.3	16.706
12	10 36 42.78	2.2650	12 46 24.8	15.774	12	12 19 54.56	2.0652	0 29 3.1	16.685
13	10 38 58.51	2.2591	12 30 36.4	15.837	13	12 21 58.41	2.0630	0 45 43.6	16.663
14	10 41 13.89	2.2533	12 14 44.3	15.898	14	12 24 2.12	2.0609	1 2 22.7	16.640
15	10 43 28.91	2.2475	11 58 48.6	15.957	15	12 26 5.71	2.0589	1 19 0.3	16.615
16	10 45 43.58	2.2417	11 42 49.4	16.014	16	12 28 9.19	2.0570	1 35 36.4	16.588
17	10 47 57.91	2.2360	11 26 46.9	16.069	17	12 30 12.55	2.0551	1 52 10.9	16.560
18	10 50 11.91	2.2304	11 10 41.1	16.122	18	12 32 15.80	2.0533	2 8 43.6	16.531
19	10 52 25.57	2.2249	10 54 32.2	16.173	19	12 34 18.95	2.0516	2 25 14.5	16.500
20	10 54 38.90	2.2195	10 38 20.4	16.222	20	12 36 21.99	2.0500	2 41 43.6	16.468
21	10 56 51.90	2.2141	10 22 5.7	16.269	21	12 38 24.95	2.0485	2 58 10.7	16.435
22	10 59 4.58	2.2087	10 5 48.2	16.314	22	12 40 27.81	2.0470	3 14 35.8	16.400
23	11 1 16.94	2.2034	9 49 28.1	16.357	23	12 42 30.58	2.0456	3 30 58.8	16.364
24	11 3 28.99	2.1983	N. 9 33 5.4	16.398	24	12 44 33.28	2.0443	S. 3 47 19.5	16.327

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	TUESDAY 5.					THURSDAY 7.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	12 44 33.28	2.0443	S. 3 47 19.5	16.327	0	14 22 31.43	2.0620	S. 15 45 4.4	13.167
1	12 46 35.90	2.0430	4 3 37.9	16.288	1	14 24 35.20	2.0637	15 58 11.7	13.077
2	12 48 38.45	2.0419	4 19 54.0	16.248	2	14 26 39.07	2.0655	16 11 13.6	12.986
3	12 50 40.93	2.0409	4 36 7.6	16.207	3	14 28 43.06	2.0673	16 24 10.0	12.894
4	12 52 43.35	2.0399	4 52 18.7	16.164	4	14 30 47.16	2.0692	16 37 0.8	12.801
5	12 54 45.71	2.0389	5 8 27.2	16.120	5	14 32 51.37	2.0712	16 49 46.0	12.707
6	12 56 48.02	2.0380	5 24 33.1	16.075	6	14 34 55.70	2.0732	17 2 25.5	12.612
7	12 58 50.28	2.0373	5 40 36.2	16.028	7	14 37 0.14	2.0752	17 14 59.3	12.516
8	13 0 52.49	2.0366	5 56 36.4	15.980	8	14 39 4.71	2.0772	17 27 27.4	12.420
9	13 2 54.66	2.0359	6 12 33.7	15.931	9	14 41 9.40	2.0792	17 39 49.8	12.323
10	13 4 56.80	2.0354	6 28 28.1	15.881	10	14 43 14.22	2.0813	17 52 6.4	12.225
11	13 6 58.92	2.0350	6 44 19.5	15.830	11	14 45 19.16	2.0835	18 4 17.0	12.127
12	13 9 1.00	2.0346	7 0 7.7	15.777	12	14 47 24.23	2.0856	18 16 21.6	12.028
13	13 11 3.06	2.0342	7 15 52.7	15.723	13	14 49 29.43	2.0877	18 28 20.3	11.928
14	13 13 5.10	2.0339	7 31 34.4	15.668	14	14 51 34.76	2.0900	18 40 12.9	11.827
15	13 15 7.12	2.0337	7 47 12.8	15.612	15	14 53 40.23	2.0923	18 51 59.5	11.725
16	13 17 9.14	2.0336	8 2 47.8	15.555	16	14 55 45.83	2.0945	19 3 39.9	11.623
17	13 19 11.15	2.0335	8 18 19.4	15.496	17	14 57 51.57	2.0968	19 15 14.1	11.520
18	13 21 13.16	2.0335	8 33 47.4	15.436	18	14 59 57.45	2.0991	19 26 42.1	11.415
19	13 23 15.17	2.0336	8 49 11.8	15.376	19	15 2 3.47	2.1014	19 38 3.9	11.310
20	13 25 17.19	2.0337	9 4 32.5	15.315	20	15 4 9.63	2.1038	19 49 19.4	11.205
21	13 27 19.22	2.0339	9 19 49.5	15.252	21	15 6 15.93	2.1062	20 0 28.5	11.098
22	13 29 21.26	2.0342	9 35 2.6	15.188	22	15 8 22.38	2.1087	20 11 31.2	10.991
23	13 31 23.32	2.0346	S. 9 50 11.9	15.123	23	15 10 28.98	2.1112	S. 20 22 27.5	10.884
	WEDNESDAY 6.					FRIDAY 8.			
0	13 33 25.41	2.0350	S. 10 5 17.3	15.056	0	15 12 35.72	2.1135	S. 20 33 17.3	10.775
1	13 35 27.52	2.0354	10 20 18.6	14.988	1	15 14 42.61	2.1159	20 44 0.5	10.666
2	13 37 29.66	2.0359	10 35 15.9	14.920	2	15 16 49.64	2.1184	20 54 37.1	10.556
3	13 39 31.83	2.0365	10 50 9.0	14.851	3	15 18 56.82	2.1209	21 5 7.1	10.445
4	13 41 34.04	2.0372	11 4 57.9	14.780	4	15 21 4.15	2.1234	21 15 30.5	10.334
5	13 43 36.30	2.0379	11 19 42.6	14.709	5	15 23 11.63	2.1259	21 25 47.2	10.222
6	13 45 38.60	2.0387	11 34 23.0	14.637	6	15 25 19.26	2.1284	21 35 57.2	10.110
7	13 47 40.94	2.0396	11 48 59.0	14.563	7	15 27 27.04	2.1310	21 46 0.4	9.997
8	13 49 43.34	2.0404	12 3 30.6	14.489	8	15 29 34.98	2.1335	21 55 56.8	9.883
9	13 51 45.79	2.0413	12 17 57.7	14.414	9	15 31 43.07	2.1361	22 5 46.3	9.768
10	13 53 48.30	2.0424	12 32 20.2	14.337	10	15 33 51.31	2.1386	22 15 28.9	9.652
11	13 55 50.88	2.0435	12 46 38.1	14.259	11	15 35 59.70	2.1411	22 25 4.6	9.536
12	13 57 53.52	2.0445	13 0 51.3	14.181	12	15 38 8.25	2.1437	22 34 33.3	9.420
13	13 59 56.23	2.0456	13 14 59.8	14.102	13	15 40 16.95	2.1462	22 43 55.0	9.303
14	14 1 59.01	2.0469	13 29 3.5	14.021	14	15 42 25.80	2.1487	22 53 9.7	9.185
15	14 4 1.86	2.0482	13 43 2.3	13.939	15	15 44 34.80	2.1513	23 2 17.3	9.067
16	14 6 4.79	2.0496	13 56 56.2	13.857	16	15 46 43.95	2.1538	23 11 17.7	8.948
17	14 8 7.80	2.0509	14 10 45.2	13.774	17	15 48 53.25	2.1563	23 20 11.0	8.828
18	14 10 10.90	2.0524	14 24 29.1	13.690	18	15 51 2.71	2.1589	23 28 57.1	8.708
19	14 12 14.09	2.0539	14 38 8.0	13.605	19	15 53 12.32	2.1614	23 37 36.0	8.588
20	14 14 17.37	2.0554	14 51 41.8	13.519	20	15 55 22.08	2.1638	23 46 7.6	8.467
21	14 16 20.74	2.0570	15 5 10.4	13.432	21	15 57 31.98	2.1663	23 54 31.9	8.345
22	14 18 24.20	2.0586	15 18 33.7	13.344	22	15 59 42.03	2.1688	24 2 48.9	8.222
23	14 20 27.76	2.0603	15 31 51.7	13.256	23	16 1 52.23	2.1712	24 10 58.6	8.099
24	14 22 31.43	2.0620	S. 15 45 4.4	13.167	24	16 4 2.58	2.1737	S. 24 19 0.8	7.976

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	SATURDAY 9.					MONDAY 11.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	16 4 2.58	2.1737	S.24 19 0.8	7.976	0	17 50 33.26	2.2459	S.28 11 25.0	1.591
1	16 6 13.08	2.1762	24 26 55.6	7.852	1	17 52 48.02	2.2460	28 12 56.4	1.453
2	16 8 23.72	2.1786	24 34 43.0	7.727	2	17 55 2.78	2.2460	28 14 19.5	1.315
3	16 10 34.50	2.1809	24 42 22.9	7.602	3	17 57 17.55	2.2460	28 15 34.3	1.177
4	16 12 45.42	2.1832	24 49 55.2	7.477	4	17 59 32.31	2.2460	28 16 40.8	1.039
5	16 14 56.49	2.1856	24 57 20.0	7.350	5	18 1 47.07	2.2459	28 17 39.0	0.901
6	16 17 7.69	2.1879	25 4 37.2	7.223	6	18 4 1.82	2.2457	28 18 28.9	0.763
7	16 19 19.03	2.1901	25 11 46.8	7.096	7	18 6 16.55	2.2454	28 19 10.5	0.625
8	16 21 30.51	2.1924	25 18 48.8	6.968	8	18 8 31.26	2.2450	28 19 43.8	0.487
9	16 23 42.12	2.1947	25 25 43.1	6.840	9	18 10 45.96	2.2446	28 20 8.9	0.349
10	16 25 53.86	2.1969	25 32 29.7	6.712	10	18 13 0.62	2.2441	28 20 25.7	0.211
11	16 28 5.74	2.1990	25 39 8.6	6.583	11	18 15 15.25	2.2435	28 20 34.2	−0.073
12	16 30 17.75	2.2011	25 45 39.7	6.454	12	18 17 29.85	2.2429	28 20 34.4	+0.065
13	16 32 29.88	2.2032	25 52 3.0	6.325	13	18 19 44.41	2.2422	28 20 26.4	0.203
14	16 34 42.13	2.2052	25 58 18.5	6.194	14	18 21 58.92	2.2415	28 20 10.1	0.340
15	16 36 54.51	2.2073	26 4 26.2	6.063	15	18 24 13.39	2.2407	28 19 45.6	0.477
16	16 39 7.01	2.2093	26 10 26.1	5.932	16	18 26 27.81	2.2398	28 19 12.9	0.614
17	16 41 19.63	2.2112	26 16 18.2	5.801	17	18 28 42.17	2.2389	28 18 31.9	0.751
18	16 43 32.36	2.2131	26 22 2.3	5.670	18	18 30 56.47	2.2379	28 17 42.7	0.888
19	16 45 45.20	2.2149	26 27 38.5	5.537	19	18 33 10.71	2.2368	28 16 45.3	1.024
20	16 47 58.16	2.2168	26 33 6.7	5.404	20	18 35 24.88	2.2356	28 15 39.7	1.161
21	16 50 11.22	2.2186	26 38 27.0	5.272	21	18 37 38.98	2.2344	28 14 26.0	1.298
22	16 52 24.39	2.2203	26 43 39.3	5.139	22	18 39 53.00	2.2331	28 13 4.1	1.434
23	16 54 37.66	2.2220	S.26 48 43.6	5.005	23	18 42 6.94	2.2317	S.28 11 34.1	1.569
	SUNDAY 10.					TUESDAY 12.			
0	16 56 51.03	2.2236	S.26 53 39.9	4.871	0	18 44 20.80	2.2303	S.28 9 55.9	1.704
1	16 59 4.50	2.2252	26 58 28.1	4.737	1	18 46 34.57	2.2288	28 8 9.6	1.840
2	17 1 18.06	2.2268	27 3 8.3	4.603	2	18 48 48.25	2.2272	28 6 15.1	1.975
3	17 3 31.71	2.2283	27 7 40.4	4.468	3	18 51 1.83	2.2256	28 4 12.6	2.109
4	17 5 45.45	2.2297	27 12 4.4	4.333	4	18 53 15.32	2.2239	28 2 2.0	2.243
5	17 7 59.27	2.2311	27 16 20.3	4.198	5	18 55 28.70	2.2221	27 59 43.4	2.377
6	17 10 13.17	2.2324	27 20 28.1	4.062	6	18 57 41.97	2.2203	27 57 16.7	2.511
7	17 12 27.15	2.2336	27 24 27.8	3.926	7	18 59 55.13	2.2184	27 54 42.0	2.645
8	17 14 41.21	2.2348	27 28 19.3	3.790	8	19 2 8.18	2.2165	27 51 59.4	2.778
9	17 16 55.34	2.2360	27 32 2.6	3.654	9	19 4 21.12	2.2146	27 49 8.8	2.910
10	17 19 9.54	2.2371	27 35 37.7	3.518	10	19 6 33.93	2.2125	27 46 10.2	3.042
11	17 21 23.80	2.2381	27 39 4.6	3.381	11	19 8 46.61	2.2103	27 43 3.6	3.174
12	17 23 38.11	2.2391	27 42 23.3	3.244	12	19 10 59.17	2.2081	27 39 49.2	3.306
13	17 25 52.48	2.2400	27 45 33.8	3.107	13	19 13 11.60	2.2059	27 36 26.9	3.437
14	17 28 6.91	2.2408	27 48 36.1	2.970	14	19 15 23.89	2.2037	27 32 56.7	3.568
15	17 30 21.39	2.2416	27 51 30.2	2.833	15	19 17 36.04	2.2014	27 29 18.7	3.699
16	17 32 35.91	2.2424	27 54 16.1	2.695	16	19 19 48.05	2.1990	27 25 32.9	3.829
17	17 34 50.47	2.2431	27 56 53.7	2.557	17	19 21 59.91	2.1966	27 21 39.3	3.958
18	17 37 5.07	2.2437	27 59 23.0	2.419	18	19 24 11.63	2.1941	27 17 38.0	4.087
19	17 39 19.71	2.2442	28 1 44.0	2.281	19	19 26 23.20	2.1915	27 13 29.0	4.216
20	17 41 34.38	2.2446	28 3 56.8	2.143	20	19 28 34.61	2.1889	27 9 12.2	4.344
21	17 43 49.07	2.2450	28 6 1.3	2.005	21	19 30 45.87	2.1863	27 4 47.7	4.471
22	17 46 3.78	2.2454	28 7 57.5	1.867	22	19 32 56.97	2.1836	27 0 15.6	4.598
23	17 48 18.51	2.2457	28 9 45.4	1.729	23	19 35 7.91	2.1809	26 55 35.9	4.725
24	17 50 33.26	2.2459	S.28 11 25.0	1.591	24	19 37 18.68	2.1782	S.26 50 48.6	4.851

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	WEDNESDAY 13.					FRIDAY 15.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	19 37 18.68	2.1782	S.26 50 48.6	4.851	0	21 18 8.53	2.0185	S.20 43 46.7	10.185
1	19 39 29.28	2.1754	26 45 53.7	4.977	1	21 20 9.54	2.0151	20 33 32.8	10.279
2	19 41 39.72	2.1725	26 40 51.3	5.103	2	21 22 10.34	2.0117	20 23 13.2	10.373
3	19 43 49.99	2.1696	26 35 41.4	5.228	3	21 24 10.94	2.0084	20 12 48.0	10.466
4	19 46 0.08	2.1667	26 30 24.0	5.352	4	21 26 11.34	2.0051	20 2 17.3	10.557
5	19 48 9.99	2.1637	26 24 59.2	5.475	5	21 28 11.55	2.0018	19 51 41.2	10.647
6	19 50 19.72	2.1607	26 19 27.0	5.598	6	21 30 11.56	1.9986	19 40 59.7	10.737
7	19 52 29.27	2.1577	26 13 47.5	5.721	7	21 32 11.37	1.9953	19 30 12.7	10.827
8	19 54 38.64	2.1546	26 8 0.6	5.843	8	21 34 10.99	1.9920	19 19 20.4	10.916
9	19 56 47.83	2.1515	26 2 6.4	5.964	9	21 36 10.42	1.9888	19 8 22.9	11.003
10	19 58 56.83	2.1484	25 56 5.0	6.084	10	21 38 9.66	1.9857	18 57 20.1	11.089
11	20 1 5.63	2.1452	25 49 56.3	6.204	11	21 40 8.71	1.9826	18 46 12.1	11.175
12	20 3 14.24	2.1420	25 43 40.5	6.324	12	21 42 7.57	1.9795	18 34 59.0	11.261
13	20 5 22.66	2.1388	25 37 17.5	6.443	13	21 44 6.25	1.9764	18 23 40.8	11.346
14	20 7 30.89	2.1355	25 30 47.3	6.561	14	21 46 4.74	1.9733	18 12 17.5	11.429
15	20 9 38.92	2.1322	25 24 10.1	6.679	15	21 48 3.05	1.9703	18 0 49.3	11.512
16	20 11 46.76	2.1289	25 17 25.8	6.796	16	21 50 1.18	1.9673	17 49 16.1	11.595
17	20 13 54.40	2.1255	25 10 34.5	6.913	17	21 51 59.13	1.9643	17 37 38.0	11.676
18	20 16 1.83	2.1222	25 3 36.2	7.029	18	21 53 56.90	1.9615	17 25 55.0	11.756
19	20 18 9.06	2.1189	24 56 31.0	7.144	19	21 55 54.50	1.9586	17 14 7.3	11.836
20	20 20 16.10	2.1155	24 49 18.9	7.259	20	21 57 51.93	1.9558	17 2 14.8	11.915
21	20 22 22.93	2.1121	24 42 0.0	7.373	21	21 59 49.19	1.9530	16 50 17.6	11.993
22	20 24 29.55	2.1087	24 34 34.2	7.486	22	22 1 46.28	1.9502	16 38 15.7	12.070
23	20 26 35.97	2.1053	S.24 27 1.7	7.598	23	22 3 43.21	1.9474	S.16 26 9.2	12.146
	THURSDAY 14.					SATURDAY 16.			
0	20 28 42.18	2.1018	S.24 19 22.4	7.710	0	22 5 39.98	1.9447	S.16 13 58.2	12.221
1	20 30 48.18	2.0983	24 11 36.4	7.822	1	22 7 36.58	1.9421	16 1 42.7	12.295
2	20 32 53.98	2.0949	24 3 43.8	7.933	2	22 9 33.03	1.9395	15 49 22.7	12.369
3	20 34 59.57	2.0914	23 55 44.5	8.043	3	22 11 29.32	1.9369	15 36 58.3	12.443
4	20 37 4.95	2.0879	23 47 38.7	8.152	4	22 13 25.46	1.9344	15 24 29.6	12.516
5	20 39 10.12	2.0844	23 39 26.3	8.260	5	22 15 21.44	1.9319	15 11 56.6	12.587
6	20 41 15.08	2.0809	23 31 7.4	8.368	6	22 17 17.28	1.9294	14 59 19.4	12.657
7	20 43 19.83	2.0775	23 22 42.1	8.475	7	22 19 12.98	1.9270	14 46 37.9	12.727
8	20 45 24.37	2.0740	23 14 10.4	8.581	8	22 21 8.53	1.9247	14 33 52.2	12.796
9	20 47 28.70	2.0704	23 5 32.3	8.687	9	22 23 3.94	1.9224	14 21 2.4	12.864
10	20 49 32.82	2.0669	22 56 47.9	8.793	10	22 24 59.22	1.9201	14 8 8.5	12.931
11	20 51 36.73	2.0634	22 47 57.2	8.897	11	22 26 54.36	1.9179	13 55 10.6	12.997
12	20 53 40.43	2.0599	22 39 0.3	9.000	12	22 28 49.37	1.9157	13 42 8.7	13.063
13	20 55 43.92	2.0564	22 29 57.2	9.103	13	22 30 44.25	1.9136	13 29 2.9	13.128
14	20 57 47.19	2.0529	22 20 47.9	9.205	14	22 32 39.00	1.9116	13 15 53.3	13.192
15	20 59 50.26	2.0494	22 11 32.5	9.307	15	22 34 33.63	1.9096	13 2 39.9	13.255
16	21 1 53.12	2.0459	22 2 11.1	9.408	16	22 36 28.15	1.9076	12 49 22.7	13.317
17	21 3 55.77	2.0424	21 52 43.6	9.508	17	22 38 22.55	1.9056	12 36 1.9	13.378
18	21 5 58.21	2.0389	21 43 10.2	9.607	18	22 40 16.83	1.9037	12 22 37.4	13.438
19	21 8 0.44	2.0355	21 33 30.8	9.705	19	22 42 11.00	1.9019	12 9 9.3	13.498
20	21 10 2.47	2.0321	21 23 45.6	9.803	20	22 44 5.06	1.9002	11 55 37.6	13.557
21	21 12 4.29	2.0287	21 13 54.5	9.900	21	22 45 59.03	1.8985	11 42 2.5	13.614
22	21 14 5.91	2.0253	21 3 57.6	9.996	22	22 47 52.89	1.8968	11 28 23.9	13.671
23	21 16 7.32	2.0219	20 53 55.0	10.091	23	22 49 46.65	1.8952	11 14 42.0	13.727
24	21 18 8.53	2.0185	S.20 43 46.7	10.185	24	22 51 40.32	1.8937	S.11 0 56.7	13.782

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	SUNDAY 17.					TUESDAY 19.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	22 51 40.32	1.8937	S.11 0 56.7	13.782	0	0 21 57.33	1.8934	N. 0 46 47.0	15.336
1	22 53 33.90	1.8923	10 47 8.1	13.837	1	0 23 50.99	1.8951	1 2 7.4	15.344
2	22 55 27.39	1.8909	10 33 16.3	13.890	2	0 25 44.75	1.8969	1 17 28.3	15.351
3	22 57 20.79	1.8895	10 19 21.3	13.942	3	0 27 38.61	1.8987	1 32 49.6	15.357
4	22 59 14.11	1.8881	10 5 23.2	13.994	4	0 29 32.58	1.9006	1 48 11.1	15.362
5	23 1 7.36	1.8868	9 51 22.0	14.045	5	0 31 26.67	1.9026	2 3 32.9	15.365
6	23 3 0.54	1.8857	9 37 17.7	14.095	6	0 33 20.89	1.9046	2 18 54.9	15.367
7	23 4 53.65	1.8846	9 23 10.6	14.144	7	0 35 15.23	1.9067	2 34 17.0	15.369
8	23 6 46.69	1.8835	9 9 0.5	14.192	8	0 37 9.70	1.9089	2 49 39.2	15.370
9	23 8 39.67	1.8825	8 54 47.5	14.239	9	0 39 4.30	1.9112	3 5 1.3	15.369
10	23 10 32.59	1.8815	8 40 31.8	14.285	10	0 40 59.04	1.9136	3 20 23.4	15.367
11	23 12 25.45	1.8806	8 26 13.3	14.331	11	0 42 53.93	1.9160	3 35 45.3	15.364
12	23 14 18.26	1.8798	8 11 52.1	14.376	12	0 44 48.96	1.9185	3 51 7.0	15.359
13	23 16 11.02	1.8790	7 57 28.3	14.419	13	0 46 44.14	1.9211	4 6 28.4	15.353
14	23 18 3.74	1.8783	7 43 1.9	14.461	14	0 48 39.48	1.9237	4 21 49.4	15.347
15	23 19 56.41	1.8776	7 28 32.9	14.503	15	0 50 34.98	1.9264	4 37 10.0	15.340
16	23 21 49.05	1.8770	7 14 1.5	14.544	16	0 52 30.65	1.9292	4 52 30.1	15.331
17	23 23 41.65	1.8765	6 59 27.6	14.584	17	0 54 26.49	1.9321	5 7 49.6	15.320
18	23 25 34.22	1.8760	6 44 51.4	14.623	18	0 56 22.51	1.9351	5 23 8.5	15.308
19	23 27 26.77	1.8756	6 30 12.9	14.661	19	0 58 18.70	1.9381	5 38 26.6	15.296
20	23 29 19.29	1.8753	6 15 32.1	14.698	20	1 0 15.07	1.9411	5 53 44.0	15.283
21	23 31 11.80	1.8750	6 0 49.2	14.734	21	1 2 11.63	1.9443	6 9 0.5	15.268
22	23 33 4.29	1.8748	5 46 4.1	14.769	22	1 4 8.39	1.9476	6 24 16.1	15.252
23	23 34 56.77	1.8747	S. 5 31 16.9	14.803	23	1 6 5.35	1.9509	N. 6 39 30.7	15.235
	MONDAY 18.					WEDNESDAY 20.			
0	23 36 49.25	1.8746	S. 5 16 27.7	14.836	0	1 8 2.50	1.9543	N. 6 54 44.2	15.216
1	23 38 41.72	1.8746	5 1 36.5	14.868	1	1 9 59.86	1.9578	7 9 56.6	15.196
2	23 40 34.20	1.8746	4 46 43.5	14.900	2	1 11 57.43	1.9614	7 25 7.7	15.175
3	23 42 26.68	1.8747	4 31 48.6	14.931	3	1 13 55.22	1.9650	7 40 17.5	15.153
4	23 44 19.17	1.8749	4 16 51.8	14.960	4	1 15 53.23	1.9687	7 55 25.9	15.129
5	23 46 11.67	1.8752	4 1 53.4	14.988	5	1 17 51.47	1.9725	8 10 32.9	15.104
6	23 48 4.19	1.8755	3 46 53.3	15.016	6	1 19 49.93	1.9763	8 25 38.4	15.078
7	23 49 56.73	1.8759	3 31 51.5	15.043	7	1 21 48.63	1.9802	8 40 42.3	15.050
8	23 51 49.30	1.8764	3 16 48.2	15.068	8	1 23 47.57	1.9843	8 55 44.5	15.022
9	23 53 41.90	1.8769	3 1 43.4	15.092	9	1 25 46.75	1.9884	9 10 44.9	14.992
10	23 55 34.53	1.8775	2 46 37.1	15.115	10	1 27 46.17	1.9925	9 25 43.5	14.960
11	23 57 27.20	1.8782	2 31 29.5	15.137	11	1 29 45.85	1.9968	9 40 40.2	14.928
12	23 59 19.92	1.8790	2 16 20.6	15.159	12	1 31 45.79	2.0012	9 55 34.9	14.895
13	0 1 12.68	1.8798	2 1 10.4	15.180	13	1 33 45.99	2.0056	10 10 27.5	14.860
14	0 3 5.49	1.8806	1 45 59.0	15.199	14	1 35 46.45	2.0100	10 25 18.0	14.823
15	0 4 58.35	1.8815	1 30 46.5	15.217	15	1 37 47.18	2.0145	10 40 6.3	14.785
16	0 6 51.27	1.8826	1 15 32.9	15.235	16	1 39 48.19	2.0191	10 54 52.2	14.746
17	0 8 44.26	1.8837	1 0 18.3	15.252	17	1 41 49.48	2.0238	11 9 35.7	14.705
18	0 10 37.32	1.8848	0 45 2.8	15.267	18	1 43 51.05	2.0286	11 24 16.7	14.663
19	0 12 30.45	1.8861	0 29 46.3	15.281	19	1 45 52.91	2.0334	11 38 55.2	14.620
20	0 14 23.65	1.8875	S. 0 14 29.1	15.294	20	1 47 55.06	2.0383	11 53 31.1	14.575
21	0 16 16.93	1.8890	N. 0 0 48.9	15.306	21	1 49 57.50	2.0433	12 8 4.2	14.529
22	0 18 10.30	1.8904	0 16 7.7	15.317	22	1 52 0.24	2.0483	12 22 34.5	14.482
23	0 20 3.77	1.8918	0 31 27.1	15.327	23	1 54 3.28	2.0534	12 37 1.9	14.433
24	0 21 57.33	1.8934	N. 0 46 47.0	15.336	24	1 56 6.64	2.0586	N.12 51 26.4	14.382

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

THURSDAY 21.

ar.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	h m s	s	° ′ ″	″
0	1 56 6.64	2.0586	N. 12 51 26.4	14.382
1	1 58 10.31	2.0638	13 5 47.8	14.330
2	2 0 14.30	2.0691	13 20 6.0	14.277
3	2 2 18.61	2.0745	13 34 21.0	14.222
4	2 4 23.24	2.0800	13 48 32.7	14.166
5	2 6 28.20	2.0855	14 2 41.0	14.109
6	2 8 33.49	2.0910	14 16 45.8	14.050
7	2 10 39.12	2.0967	14 30 47.0	13.989
8	2 12 45.10	2.1024	14 44 44.5	13.927
9	2 14 51.42	2.1082	14 58 38.2	13.864
0	2 16 58.08	2.1141	15 12 28.1	13.799
1	2 19 5.10	2.1200	15 26 14.1	13.733
2	2 21 12.48	2.1260	15 39 56.1	13.665
3	2 23 20.22	2.1321	15 53 33.9	13.595
4	2 25 28.32	2.1382	16 7 7.5	13.524
5	2 27 36.78	2.1442	16 20 36.8	13.452
6	2 29 45.62	2.1504	16 34 1.8	13.378
7	2 31 54.83	2.1567	16 47 22.3	13.302
8	2 34 4.42	2.1630	17 0 38.1	13.225
9	2 36 14.39	2.1694	17 13 49.2	13.146
0	2 38 24.74	2.1758	17 26 55.6	13.066
1	2 40 35.47	2.1822	17 39 57.2	12.985
2	2 42 46.60	2.1887	17 52 53.8	12.902
3	2 44 58.12	2.1953	N. 18 5 45.3	12.817

FRIDAY 22.

ar.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
0	2 47 10.03	2.2019	N. 18 18 31.7	12.730
1	2 49 22.34	2.2085	18 31 12.8	12.642
2	2 51 35.05	2.2152	18 43 48.6	12.552
3	2 53 48.17	2.2220	18 56 19.0	12.460
4	2 56 1.69	2.2288	19 8 43.9	12.367
5	2 58 15.62	2.2356	19 21 3.1	12.273
6	3 0 29.96	2.2424	19 33 16.6	12.177
7	3 2 44.71	2.2493	19 45 24.3	12.079
8	3 4 59.87	2.2562	19 57 26.1	11.980
9	3 7 15.45	2.2631	20 9 21.9	11.879
0	3 9 31.45	2.2701	20 21 11.5	11.776
1	3 11 47.87	2.2771	20 32 54.9	11.671
2	3 14 4.71	2.2842	20 44 32.0	11.565
3	3 16 21.97	2.2913	20 56 2.7	11.457
4	3 18 39.66	2.2983	21 7 26.9	11.347
5	3 20 57.77	2.3054	21 18 44.5	11.237
6	3 23 16.31	2.3125	21 29 55.4	11.125
7	3 25 35.27	2.3196	21 40 59.4	11.010
8	3 27 54.66	2.3268	21 51 56.5	10.894
9	3 30 14.48	2.3339	22 2 46.7	10.777
0	3 32 34.72	2.3410	22 13 29.8	10.658
1	3 34 55.39	2.3481	22 24 5.7	10.537
2	3 37 16.49	2.3552	22 34 34.3	10.415
3	3 39 38.02	2.3624	22 44 55.4	10.291
4	3 41 59.98	2.3696	N. 22 55 9.1	10.165

SATURDAY 23.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	h m s	s	° ′ ″	″
0	3 41 59.98	2.3696	N. 22 55 9.1	10.165
1	3 44 22.37	2.3767	23 5 15.2	10.038
2	3 46 45.18	2.3838	23 15 13.6	9.909
3	3 49 8.42	2.3909	23 25 4.2	9.778
4	3 51 32.08	2.3980	23 34 46.9	9.646
5	3 53 56.17	2.4051	23 44 21.6	9.512
6	3 56 20.69	2.4121	23 53 48.3	9.376
7	3 58 45.63	2.4191	24 3 6.8	9.239
8	4 1 10.98	2.4261	24 12 17.0	9.100
9	4 3 36.75	2.4331	24 21 18.8	8.960
10	4 6 2.94	2.4400	24 30 12.2	8.819
11	4 8 29.54	2.4468	24 38 57.0	8.675
12	4 10 56.56	2.4537	24 47 33.2	8.530
13	4 13 23.99	2.4605	24 56 0.6	8.384
14	4 15 51.82	2.4672	25 4 19.2	8.235
15	4 18 20.05	2.4739	25 12 28.8	8.085
16	4 20 48.69	2.4805	25 20 29.5	7.934
17	4 23 17.72	2.4871	25 28 20.9	7.782
18	4 25 47.15	2.4937	25 36 3.3	7.628
19	4 28 16.97	2.5002	25 43 36.3	7.472
20	4 30 47.17	2.5065	25 50 59.9	7.315
21	4 33 17.75	2.5128	25 58 14.1	7.157
22	4 35 48.70	2.5191	26 5 18.7	6.997
23	4 38 20.03	2.5252	N. 26 12 13.6	6.835

SUNDAY 24.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
0	4 40 51.73	2.5313	N. 26 18 58.9	6.672
1	4 43 23.79	2.5373	26 25 34.3	6.508
2	4 45 56.20	2.5432	26 31 59.9	6.343
3	4 48 28.97	2.5491	26 38 15.4	6.176
4	4 51 2.09	2.5548	26 44 20.9	6.007
5	4 53 35.54	2.5604	26 50 16.3	5.837
6	4 56 9.33	2.5659	26 56 1.4	5.667
7	4 58 43.45	2.5713	27 1 36.3	5.495
8	5 1 17.89	2.5766	27 7 0.8	5.321
9	5 3 52.65	2.5818	27 12 14.9	5.147
10	5 6 27.71	2.5869	27 17 18.5	4.972
11	5 9 3.08	2.5919	27 22 11.5	4.795
12	5 11 38.74	2.5968	27 26 53.9	4.616
13	5 14 14.69	2.6015	27 31 25.6	4.437
14	5 16 50.91	2.6060	27 35 46.5	4.258
15	5 19 27.41	2.6104	27 39 56.6	4.077
16	5 22 4.17	2.6148	27 43 55.7	3.895
17	5 24 41.19	2.6190	27 47 44.0	3.712
18	5 27 18.45	2.6230	27 51 21.2	3.528
19	5 29 55.95	2.6269	27 54 47.3	3.343
20	5 32 33.69	2.6307	27 58 2.4	3.157
21	5 35 11.65	2.6344	28 1 6.2	2.971
22	5 37 49.82	2.6379	28 3 58.8	2.784
23	5 40 28.19	2.6412	28 6 40.2	2.595
24	5 43 6.76	2.6444	N. 28 9 10.2	2.406

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	MONDAY 25.					WEDNESDAY 27.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	5 43 6.76	2.6444	N.28 9 10.2	2.406	0	7 50 35.08	2.6054	N.26 21 58.2	6.785
1	5 45 45.51	2.6475	28 11 28.9	2.217	1	7 53 11.27	2.6009	26 15 5.7	6.963
2	5 48 24.44	2.6504	28 13 36.2	2.026	2	7 55 47.18	2.5963	26 8 2.6	7.140
3	5 51 3.54	2.6530	28 15 32.0	1.835	3	7 58 22.82	2.5916	26 0 48.9	7.316
4	5 53 42.80	2.6555	28 17 16.4	1.644	4	8 0 58.18	2.5868	25 53 24.7	7.491
5	5 56 22.21	2.6579	28 18 49.2	1.451	5	8 3 33.25	2.5820	25 45 50.1	7.664
6	5 59 1.75	2.6601	28 20 10.5	1.258	6	8 6 8.02	2.5771	25 38 5.1	7.836
7	6 1 41.42	2.6622	28 21 20.2	1.065	7	8 8 42.49	2.5720	25 30 9.8	8.00
8	6 4 21.21	2.6641	28 22 18.3	0.871	8	8 11 16.66	2.5668	25 22 4.3	8.176
9	6 7 1.11	2.6658	28 23 4.7	0.677	9	8 13 50.52	2.5616	25 13 48.6	8.34
10	6 9 41.11	2.6674	28 23 39.5	0.483	10	8 16 24.06	2.5563	25 5 22.9	8.51
11	6 12 21.20	2.6688	28 24 2.7	0.288	11	8 18 57.27	2.5509	24 56 47.2	8.677
12	6 15 1.36	2.6700	28 24 14.2	+0.093	12	8 21 30.16	2.5454	24 48 1.7	8.842
13	6 17 41.59	2.6711	28 24 13.9	−0.102	13	8 24 2.72	2.5398	24 39 6.3	9.004
14	6 20 21.88	2.6720	28 24 1.9	0.298	14	8 26 34.94	2.5342	24 30 1.2	9.165
15	6 23 2.22	2.6727	28 23 38.2	0.494	15	8 29 6.83	2.5285	24 20 46.5	9.325
16	6 25 42.60	2.6732	28 23 2.7	0.689	16	8 31 38.37	2.5228	24 11 22.3	9.483
17	6 28 23.01	2.6736	28 22 15.5	0.884	17	8 34 9.56	2.5171	24 1 48.5	9.640
18	6 31 3.43	2.6738	28 21 16.6	1.080	18	8 36 40.41	2.5112	23 52 5.5	9.795
19	6 33 43.86	2.6738	28 20 5.9	1.276	19	8 39 10.90	2.5052	23 42 13.1	9.949
20	6 36 24.29	2.6737	28 18 43.4	1.472	20	8 41 41.03	2.4992	23 32 11.6	10.101
21	6 39 4.70	2.6734	28 17 9.1	1.668	21	8 44 10.81	2.4932	23 22 1.0	10.251
22	6 41 45.09	2.6729	28 15 23.1	1.864	22	8 46 40.22	2.4872	23 11 41.4	10.400
23	6 44 25.44	2.6722	N.28 13 25.4	2.060	23	8 49 9.27	2.4811	N.23 1 13.0	10.548
	TUESDAY 26.					THURSDAY 28.			
0	6 47 5.75	2.6714	N.28 11 15.9	2.256	0	8 51 37.95	2.4750	N.22 50 35.7	10.694
1	6 49 46.00	2.6704	28 8 54.7	2.453	1	8 54 6.26	2.4688	22 39 49.7	10.838
2	6 52 26.19	2.6692	28 6 21.8	2.648	2	8 56 34.20	2.4625	22 28 55.2	10.981
3	6 55 6.31	2.6679	28 3 37.2	2.841	3	8 59 1.77	2.4563	22 17 52.1	11.122
4	6 57 46.35	2.6664	28 0 41.0	3.035	4	9 1 28.97	2.4501	22 6 40.7	11.261
5	7 0 26.29	2.6648	27 57 33.1	3.229	5	9 3 55.79	2.4438	21 55 20.9	11.398
6	7 3 6.12	2.6630	27 54 13.6	3.422	6	9 6 22.23	2.4375	21 43 53.0	11.533
7	7 5 45.84	2.6610	27 50 42.5	3.614	7	9 8 48.29	2.4312	21 32 16.9	11.667
8	7 8 25.44	2.6589	27 46 59.8	3.807	8	9 11 13.97	2.4249	21 20 32.9	11.800
9	7 11 4.91	2.6566	27 43 5.7	3.999	9	9 13 39.28	2.4186	21 8 41.0	11.931
10	7 13 44.24	2.6542	27 39 0.0	4.190	10	9 16 4.21	2.4123	20 56 41.2	12.060
11	7 16 23.41	2.6516	27 34 42.8	4.381	11	9 18 28.76	2.4060	20 44 33.9	12.187
12	7 19 2.43	2.6488	27 30 14.3	4.571	12	9 20 52.93	2.3996	20 32 18.9	12.312
13	7 21 41.28	2.6459	27 25 34.4	4.760	13	9 23 16.71	2.3933	20 19 56.5	12.435
14	7 24 19.95	2.6429	27 20 43.1	4.948	14	9 25 40.11	2.3870	20 7 26.7	12.557
15	7 26 58.43	2.6398	27 15 40.5	5.136	15	9 28 3.14	2.3807	19 54 49.6	12.677
16	7 29 36.72	2.6365	27 10 26.7	5.323	16	9 30 25.79	2.3744	19 42 5.4	12.795
17	7 32 14.80	2.6330	27 5 1.8	5.509	17	9 32 48.06	2.3681	19 29 14.2	12.912
18	7 34 52.68	2.6294	26 59 25.7	5.694	18	9 35 9.96	2.3618	19 16 16.0	13.027
19	7 37 30.34	2.6257	26 53 38.5	5.878	19	9 37 31.48	2.3555	19 3 11.0	13.140
20	7 40 7.77	2.6219	26 47 40.2	6.062	20	9 39 52.63	2.3493	18 49 59.3	13.251
21	7 42 44.96	2.6180	26 41 31.0	6.245	21	9 42 13.40	2.3431	18 36 41.0	13.360
22	7 45 21.92	2.6139	26 35 10.9	6.426	22	9 44 33.80	2.3369	18 23 16.2	13.468
23	7 47 58.63	2.6097	26 28 40.0	6.606	23	9 46 53.83	2.3307	18 9 45.0	13.573
24	7 50 35.08	2.6054	N.26 21 58.2	6.785	24	9 49 13.49	2.3246	N.17 56 7.5	13.676

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	FRIDAY 29.			
	h m s	s	° ′ ″	″
0	9 49 13.49	2.3246	N.17 56 7.5	13.676
1	9 51 32.78	2.3186	17 42 23.8	13.779
2	9 53 51.71	2.3125	17 28 34.0	13.879
3	9 56 10.28	2.3064	17 14 38.3	13.977
4	9 58 28.49	2.3004	17 0 36.8	14.074
5	10 0 46.34	2.2945	16 46 29.5	14.169
6	10 3 3.83	2.2886	16 32 16.5	14.262
7	10 5 20.97	2.2827	16 17 58.0	14.353
8	10 7 37.76	2.2769	16 3 34.1	14.442
9	10 9 54.20	2.2711	15 49 4.9	14.530
10	10 12 10.30	2.2654	15 34 30.5	14.616
11	10 14 26.05	2.2598	15 19 51.1	14.700
12	10 16 41.47	2.2542	15 5 6.7	14.782
13	10 18 56.55	2.2486	14 50 17.3	14.862
14	10 21 11.30	2.2431	14 35 23.1	14.941
15	10 23 25.72	2.2376	14 20 24.3	15.018
16	10 25 39.81	2.2322	14 5 21.0	15.093
17	10 27 53.58	2.2269	13 50 13.3	15.166
18	10 30 7.03	2.2216	13 35 1.2	15.237
19	10 32 20.17	2.2164	13 19 44.9	15.306
20	10 34 33.00	2.2112	13 4 24.4	15.374
21	10 36 45.52	2.2061	12 48 59.9	15.440
22	10 38 57.74	2.2011	12 33 31.5	15.504
23	10 41 9.65	2.1961	N.12 17 59.3	15.567
	SATURDAY 30.			
0	10 43 21.27	2.1912	N.12 2 23.5	15.628
1	10 45 32.60	2.1864	11 46 44.1	15.687
2	10 47 43.64	2.1816	11 31 1.2	15.744
3	10 49 54.39	2.1769	11 15 14.9	15.799
4	10 52 4.86	2.1723	10 59 25.3	15.852
5	10 54 15.06	2.1677	10 43 32.5	15.904
6	10 56 24.99	2.1632	10 27 36.7	15.955
7	10 58 34.65	2.1588	10 11 38.0	16.003
8	11 0 44.04	2.1545	9 55 36.4	16.049
9	11 2 53.18	2.1502	9 39 32.1	16.094
10	11 5 2.07	2.1460	9 23 25.1	16.138
11	11 7 10.70	2.1419	9 7 15.5	16.180
12	11 9 19.09	2.1378	8 51 3.5	16.219
13	11 11 27.24	2.1338	8 34 49.2	16.257
14	11 13 35.15	2.1299	8 18 32.6	16.294
15	11 15 42.83	2.1261	8 2 13.9	16.329
16	11 17 50.28	2.1224	7 45 53.2	16.362
17	11 19 57.51	2.1187	7 29 30.6	16.393
18	11 22 4.53	2.1151	7 13 6.1	16.423
19	11 24 11.33	2.1116	6 56 39.9	16.451
20	11 26 17.92	2.1081	6 40 12.0	16.477
21	11 28 24.31	2.1048	6 23 42.6	16.502
22	11 30 30.50	2.1016	6 7 11.7	16.525
23	11 32 36.49	2.0984	5 50 39.5	16.547
24	11 34 42.30	2.0952	N. 5 34 6.1	16.567

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	SUNDAY 31.			
	h m s	s	° ′ ″	″
0	11 34 42.30	2.0952	N. 5 34 6.1	16.567
1	11 36 47.92	2.0921	5 17 31.5	16.585
2	11 38 53.36	2.0892	5 0 55.9	16.602
3	11 40 58.62	2.0863	4 44 19.4	16.617
4	11 43 3.71	2.0835	4 27 42.0	16.630
5	11 45 8.64	2.0808	4 11 3.8	16.642
6	11 47 13.41	2.0781	3 54 25.0	16.651
7	11 49 18.02	2.0756	3 37 45.6	16.659
8	11 51 22.48	2.0731	3 21 5.7	16.667
9	11 53 26.79	2.0706	3 4 25.4	16.673
10	11 55 30.96	2.0683	2 47 44.9	16.677
11	11 57 35.00	2.0661	2 31 4.2	16.679
12	11 59 38.90	2.0639	2 14 23.4	16.680
13	12 1 42.67	2.0618	1 57 42.6	16.680
14	12 3 46.32	2.0598	1 41 1.9	16.678
15	12 5 49.85	2.0579	1 24 21.3	16.674
16	12 7 53.27	2.0561	1 7 41.0	16.669
17	12 9 56.58	2.0543	0 51 1.0	16.662
18	12 11 59.78	2.0526	0 34 21.5	16.654
19	12 14 2.89	2.0510	0 17 42.6	16.644
20	12 16 5.90	2.0494	N. 0 1 4.3	16.632
21	12 18 8.82	2.0479	S. 0 15 33.3	16.620
22	12 20 11.65	2.0466	0 32 10.1	16.606
23	12 22 14.41	2.0453	S. 0 48 46.1	16.590
	MONDAY, APRIL 1.			
0	12 24 17.09	2.0440	S. 1 5 21.0	16.573

PHASES OF THE MOON.

			d	h	m
○	Full Moon . . .	Mar.	2	22	41.9
☾	Last Quarter		10	7	55.5
●	New Moon		18	10	8.8
☽	First Quarter		25	15	1.9

			d	h
☾	Apogee	Mar.	12	16.9
☾	Perigee		28	8.9

AT GREENWICH APPARENT NOON.

Day of the Week	Day of the Month.	THE SUN'S					Sidereal Time of Semidiameter Passing Meridian.	Equation of Time, to be Added to	Diff. for 1 Hour.
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.	Semidiameter.		Subtracted from Apparent Time.	
		h m s	s	° ′ ″	″	′ ″	s	m s	s
Mon.	1	0 41 55.28	9.097	N. 4 30 43.9	+57.84	16 1.80	64.48	4 0.51	0.758
Tues.	2	0 45 33.66	9.102	4 53 49.7	57.63	16 1.52	64.50	3 42.39	0.753
Wed.	3	0 49 12.16	9.107	5 16 50.3	57.41	16 1.24	64.52	3 24.39	0.747
Thur.	4	0 52 50.81	9.113	5 39 45.3	+57.18	16 0.96	64.54	3 6.54	0.740
Frid.	5	0 56 29.64	9.121	6 2 34.4	56.94	16 0.68	64.56	2 48.87	0.732
Sat.	6	1 0 8.67	9.130	6 25 17.5	56.68	16 0.40	64.59	2 31.39	0.724
SUN.	7	1 3 47.91	9.140	6 47 54.0	+56.39	16 0.12	64.62	2 14.12	0.715
Mon.	8	1 7 27.38	9.150	7 10 23.7	56.09	15 59.84	64.66	1 57.08	0.705
Tues.	9	1 11 7.10	9.161	7 32 46.3	55.78	15 59.56	64.70	1 40.29	0.694
Wed.	10	1 14 47.09	9.172	7 55 1.4	+55.46	15 59.28	64.74	1 23.77	0.682
Thur.	11	1 18 27.37	9.184	8 17 8.6	55.13	15 59.00	64.78	1 7.54	0.670
Frid.	12	1 22 7.95	9.197	8 39 7.7	54.78	15 58.73	64.83	0 51.61	0.657
Sat.	13	1 25 48.85	9.211	9 0 58.1	+54.42	15 58.45	64.87	0 35.99	0.644
SUN.	14	1 29 30.08	9.225	9 22 39.8	54.04	15 58.18	64.92	0 20.71	0.630
Mon.	15	1 33 11.66	9.239	9 44 12.2	53.65	15 57.91	64.97	0 5.78	0.615
Tues.	16	1 36 53.61	9.254	10 5 35.0	+53.24	15 57.64	65.02	0 8.79	0.600
Wed.	17	1 40 35.93	9.270	10 26 47.8	52.82	15 57.37	65.07	0 23.00	0.584
Thur.	18	1 44 18.61	9.287	10 47 50.3	52.38	15 57.11	65.12	0 36.83	0.568
Frid.	19	1 48 1.69	9.304	11 8 42.1	+51.93	15 56.85	65.18	0 50.27	0.551
Sat.	20	1 51 45.17	9.321	11 29 22.8	51.46	15 56.59	65.24	1 3.30	0.534
SUN.	21	1 55 29.07	9.338	11 49 52.1	50.97	15 56.34	65.31	1 15.92	0.517
Mon.	22	1 59 13.39	9.356	12 10 9.7	+50.48	15 56.09	65.38	1 28.12	0.499
Tues.	23	2 2 58.14	9.374	12 30 15.2	49.97	15 55.84	65.44	1 39.89	0.481
Wed.	24	2 6 43.34	9.393	12 50 8.3	49.44	15 55.59	65.51	1 51.22	0.463
Thur.	25	2 10 28.99	9.412	13 9 48.5	+48.90	15 55.34	65.58	2 2.10	0.444
Frid.	26	2 14 15.10	9.431	13 29 15.7	48.35	15 55.10	65.65	2 12.51	0.424
Sat.	27	2 18 1.69	9.451	13 48 29.5	47.79	15 54.86	65.72	2 22.44	0.404
SUN.	28	2 21 48.78	9.472	14 7 29.6	+47.22	15 54.62	65.80	2 31.89	0.383
Mon.	29	2 25 36.37	9.493	14 26 15.8	46.63	15 54.38	65.87	2 40.84	0.362
Tues.	30	2 29 24.47	9.515	14 44 47.6	46.03	15 54.14	65.95	2 49.27	0.340
Wed.	31	2 33 13.08	9.537	N. 15 3 4.9	+45.41	15 53.90	66.03	2 57.18	0.318

NOTE.—The mean time of semidiameter passing may be found by subtracting $0^s.18$ from the sidereal time.
The sign + prefixed to the hourly change of declination indicates that north declinations are increasing.

APRIL, 1912.

AT GREENWICH MEAN NOON.

Day of the Week.	Day of the Month.	THE SUN'S Apparent Right Ascension.	THE SUN'S Diff. for 1 Hour.	THE SUN'S Apparent Declination.	THE SUN'S Diff. for 1 Hour.	Equation of Time, to be Subtracted from / Added to Mean Time.	Diff. for 1 Hour.	Sidereal Time, or Right Ascension of Mean Sun.
		h m s	s	° ′ ″	″	m s	s	h m s
Mon.	1	0 41 54.67	9.099	N. 4 30 40.0	+57.86	4 0.56	0.758	0 37 54.11
Tues.	2	0 45 33.09	9.104	4 53 46.1	57.64	3 42.43	0.753	0 41 50.66
Wed.	3	0 49 11.64	9.109	5 16 47.0	57.42	3 24.43	0.747	0 45 47.22
Thur.	4	0 52 50.34	9.115	5 39 42.3	+57.18	3 6.57	0.740	0 49 43.77
Frid.	5	0 56 29.22	9.123	6 2 31.8	56.93	2 48.89	0.732	0 53 40.32
Sat.	6	1 0 8.29	9.132	6 25 15.1	56.67	2 31.41	0.724	0 57 36.88
SUN.	7	1 3 47.57	9.142	6 47 51.9	+56.39	2 14.14	0.715	1 1 33.43
Mon.	8	1 7 27.08	9.152	7 10 21.9	56.10	1 57.10	0.705	1 5 29.99
Tues.	9	1 11 6.85	9.162	7 32 44.8	55.79	1 40.31	0.694	1 9 26.54
Wed.	10	1 14 46.88	9.173	7 55 0.1	+55.47	1 23.79	0.682	1 13 23.10
Thur.	11	1 18 27.20	9.186	8 17 7.6	55.14	1 7.55	0.670	1 17 19.65
Frid.	12	1 22 7.82	9.199	8 39 6.9	54.79	0 51.62	0.657	1 21 16.20
Sat.	13	1 25 48.76	9.213	9 0 57.6	+54.43	0 36.00	0.644	1 25 12.76
SUN.	14	1 29 30.03	9.227	9 22 39.5	54.05	0 20.72	0.630	1 29 9.31
Mon.	15	1 33 11.65	9.241	9 44 12.1	53.66	0 5.78	0.615	1 33 5.87
Tues.	16	1 36 53.63	9.256	10 5 35.1	+53.25	0 8.80	0.600	1 37 2.42
Wed.	17	1 40 35.97	9.272	10 26 48.1	52.83	0 23.01	0.584	1 40 58.98
Thur.	18	1 44 18.69	9.288	10 47 50.8	52.39	0 36.84	0.568	1 44 55.53
Frid.	19	1 48 1.81	9.305	11 8 42.8	+51.94	0 50.28	0.551	1 48 52.09
Sat.	20	1 51 45.33	9.322	11 29 23.7	51.47	1 3.31	0.534	1 52 48.64
SUN.	21	1 55 29.27	9.339	11 49 53.2	50.98	1 15.93	0.517	1 56 45.20
Mon.	22	1 59 13.62	9.357	12 10 11.0	+50.49	1 28.13	0.499	2 0 41.75
Tues.	23	2 2 58.40	9.375	12 30 16.6	49.98	1 39.90	0.481	2 4 38.31
Wed.	24	2 6 43.63	9.394	12 50 9.8	49.45	1 51.23	0.463	2 8 34.86
Thur.	25	2 10 29.31	9.413	13 9 50.2	+48.91	2 2.11	0.444	2 12 31.42
Frid.	26	2 14 15.45	9.433	13 29 17.5	48.35	2 12.52	0.424	2 16 27.97
Sat.	27	2 18 2.07	9.453	13 48 31.4	47.79	2 22.46	0.404	2 20 24.53
SUN.	28	2 21 49.18	9.473	14 7 31.6	+47.22	2 31.91	0.383	2 24 21.08
Mon.	29	2 25 36.79	9.494	14 26 17.8	46.63	2 40.86	0.362	2 28 17.64
Tues.	30	2 29 24.91	9.516	14 44 49.7	46.03	2 49.29	0.340	2 32 14.19
Wed.	31	2 33 13.55	9.538	N. 15 3 7.1	+45.41	2 57.20	0.318	2 36 10.75

Note.—The semidiameter for mean noon may be assumed the same as that for apparent noon. The sign + prefixed to the hourly change of declination indicates that north declinations are increasing.

Diff. for 1 Hour,
$+9^{s}.8565$.
(Table III.)

AT GREENWICH MEAN NOON.

Day of the Month.	Day of the Year.	THE SUN'S True Longitude. λ	THE SUN'S True Longitude. λ'	THE SUN'S Diff. for 1 Hour.	THE SUN'S Latitude.	Logarithm of the Radius Vector of the Earth.	Diff. for 1 Hour.	Mean Time of Sidereal Noon.
		° ′ ″	′ ″	″	″			h m s
1	92	11 24 12.0	24 6.3	147.85	+0.02	9.999 8671	+52.0	23 18 16.19
2	93	12 23 19.4	23 13.5	147.76	—0.12	9.999 9922	52.2	23 14 20.28
3	94	13 22 24.7	22 18.7	147.68	0.26	0.000 1178	52.4	23 10 24.38
4	95	14 21 28.1	21 22.0	147.60	—0.39	0.000 2439	+52.6	23 6 28.47
5	96	15 20 29.6	20 23.4	147.52	0.51	0.000 3704	52.7	23 2 32.56
6	97	16 19 29.3	19 22.9	147.44	0.61	0.000 4971	52.8	22 58 36.65
7	98	17 18 27.1	18 20.7	147.37	—0.69	0.000 6239	+52.8	22 54 40.74
8	99	18 17 23.2	17 16.7	147.30	0.74	0.000 7506	52.8	22 50 44.84
9	100	19 16 17.6	16 10.9	147.23	0.77	0.000 8772	52.7	22 46 48.93
10	101	20 15 10.2	15 3.3	147.15	—0.76	0.001 0034	+52.5	22 42 53.02
11	102	21 14 1.0	13 54.0	147.08	0.75	0.001 1292	52.3	22 38 57.11
12	103	22 12 50.1	12 43.0	147.01	0.70	0.001 2544	52.0	22 35 1.20
13	104	23 11 37.4	11 30.2	146.93	—0.61	0.001 3789	+51.6	22 31 5.29
14	105	24 10 22.9	10 15.6	146.86	0.52	0.001 5026	51.3	22 27 9.38
15	106	25 9 6.6	8 59.2	146.78	0.40	0.001 6253	50.9	22 23 13.48
16	107	26 7 48.5	7 41.0	146.71	—0.26	0.001 7469	+50.4	22 19 17.57
17	108	27 6 28.5	6 20.9	146.63	—0.13	0.001 8673	49.9	22 15 21.66
18	109	28 5 6.6	4 58.8	146.55	0.00	0.001 9865	49.4	22 11 25.75
19	110	29 3 42.7	3 34.7	146.46	+0.12	0.002 1045	+48.9	22 7 29.84
20	111	30 2 16.7	2 8.6	146.37	0.22	0.002 2212	48.4	22 3 33.93
21	112	31 0 48.6	0 40.4	146.28	0.30	0.002 3366	47.9	21 59 38.02
22	113	31 59 18.3	59 10.0	146.19	+0.35	0.002 4510	+47.4	21 55 42.11
23	114	32 57 45.9	57 37.5	146.10	0.36	0.002 5644	47.0	21 51 46.20
24	115	33 56 11.4	56 2.8	146.01	0.34	0.002 6768	46.6	21 47 50.30
25	116	34 54 34.6	54 25.9	145.92	+0.29	0.002 7884	+46.3	21 43 54.39
26	117	35 52 55.7	52 46.9	145.83	0.21	0.002 8992	46.0	21 39 58.48
27	118	36 51 14.8	51 5.8	145.75	+0.11	0.003 0094	45.8	21 36 2.57
28	119	37 49 31.8	49 22.6	145.67	—0.02	0.003 1191	+45.6	21 32 6.66
29	120	38 47 46.8	47 37.5	145.59	0.16	0.003 2284	45.4	21 28 10.75
30	121	39 45 59.9	45 50.5	145.51	0.30	0.003 3373	45.2	21 24 14.84
31	122	40 44 11.2	44 1.6	145.43	—0.42	0.003 4457	+45.1	21 20 18.93

NOTE.—The longitudes in the column λ are referred to the true equinox of their own date, while those in the column λ' are referred to the mean equinox of the beginning of the Besselian fictitious year.

Diff. for 1 Hour,
$-9^s.8296$.
(Table II.)

GREENWICH MEAN TIME.

Day of the Month.	THE MOON'S								
	SEMIDIAMETER.		HORIZONTAL PARALLAX.				UPPER TRANSIT.		AGE.
	Noon.	Midnight.	Noon.	Diff. for 1 Hour.	Midnight.	Diff. for 1 Hour.	Meridian of Greenwich.	Diff. for 1 Hour.	Noon.
	′ ″	′ ″	′ ″	″	′ ″	″	h m	m	d
1	15 59.3	15 54.6	58 34.6	−1.36	58 17.3	−1.51	12 9.2	1.93	13.6
2	15 49.4	15 43.9	57 58.4	1.63	57 38.2	1.72	12 55.6	1.94	14.6
3	15 38.2	15 32.4	57 17.2	1.77	56 55.7	1.79	13 42.8	2.00	15.6
4	15 26.5	15 20.7	56 34.3	−1.77	56 13.3	−1.72	14 31.6	2.07	16.6
5	15 15.2	15 10.0	55 53.1	1.64	55 34.0	1.53	15 22.0	2.13	17.6
6	15 5.2	15 0.9	55 16.4	1.40	55 0.5	1.24	16 13.9	2.18	18.6
7	14 57.1	14 54.0	54 46.7	−1.06	54 35.1	−0.87	17 6.3	2.18	19.6
8	14 51.5	14 49.7	54 25.9	0.66	54 19.2	0.45	17 58.1	2.13	20.6
9	14 48.5	14 48.1	54 15.1	−0.23	54 13.6	−0.01	18 48.3	2.05	21.6
10	14 48.5	14 49.5	54 14.8	+0.20	54 18.5	+0.41	19 36.3	1.95	22.6
11	14 51.2	14 53.5	54 24.7	0.62	54 33.4	0.82	20 21.9	1.86	23.6
12	14 56.5	15 0.0	54 44.3	0.99	54 57.2	1.15	21 5.7	1.80	24.6
13	15 4.0	15 8.5	55 12.0	+1.30	55 28.4	+1.42	21 48.3	1.76	25.6
14	15 13.3	15 18.4	55 46.1	1.52	56 4.8	1.58	22 30.7	1.78	26.6
15	15 23.7	15 29.0	56 24.1	1.62	56 43.7	1.63	23 14.1	1.84	27.6
16	15 34.4	15 39.6	57 3.3	+1.62	57 22.5	+1.57	23 59.5	1.95	28.6
17	15 44.6	15 49.3	57 40.9	1.49	57 58.3	1.39	6	. .	0.0
18	15 53.7	15 57.7	58 14.3	1.27	58 28.8	1.14	0 48.2	2.12	1.0
19	16 1.2	16 4.2	58 41.6	+0.99	58 52.6	+0.84	1 41.3	2.31	2.0
20	16 6.7	16 8.7	59 1.8	0.69	59 9.1	0.53	2 39.0	2.50	3.0
21	16 10.1	16 11.1	59 14.5	0.38	59 18.2	+0.24	3 40.6	2.62	4.0
22	16 11.7	16 11.9	59 20.3	+0.11	59 20.9	−0.01	4 43.9	2.63	5.0
23	16 11.6	16 11.0	59 20.0	−0.13	59 17.8	0.23	5 45.9	2.53	6.0
24	16 10.1	16 8.8	59 14.4	0.33	59 9.8	0.42	6 44.6	2.36	7.0
25	16 7.3	16 5.5	59 4.2	−0.51	58 57.5	−0.60	7 39.0	2.18	8.0
26	16 3.4	16 0.9	58 49.7	0.69	58 40.8	0.78	8 29.4	2.03	9.0
27	15 58.2	15 55.2	58 30.9	0.87	58 19.9	0.96	9 16.9	1.93	10.0
28	15 52.0	15 48.4	58 7.9	−1.04	57 54.9	−1.13	10 2.7	1.89	11.0
29	15 44.6	15 40.5	57 40.8	1.21	57 25.9	1.27	10 48.2	1.90	12.0
30	15 36.3	15 31.8	57 10.3	1.33	56 54.0	1.38	11 34.3	1.95	13.0
31	15 27.3	15 22.7	56 37.3	−1.40	56 20.4	−1.40	12 22.1	2.03	14.0

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	MONDAY 1.					WEDNESDAY 3.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	12 24 17.09	2.0440	S. 1 5 21.0	16.573	0	14 2 20.31	2.0663	S. 13 35 13.4	14.181
1	12 26 19.70	2.0429	1 21 54.8	16.554	1	14 4 24.35	2.0682	13 49 21.9	14.102
2	12 28 22.24	2.0418	1 38 27.5	16.534	2	14 6 28.50	2.0702	14 3 25.5	14.021
3	12 30 24.72	2.0407	1 54 59.0	16.513	3	14 8 32.77	2.0722	14 17 24.3	13.939
4	12 32 27.14	2.0398	2 11 29.1	16.490	4	14 10 37.16	2.0742	14 31 18.2	13.856
5	12 34 29.50	2.0390	2 27 57.8	16.466	5	14 12 41.68	2.0763	14 45 7.0	13.772
6	12 36 31.81	2.0382	2 44 25.0	16.440	6	14 14 46.33	2.0785	14 58 50.8	13.687
7	12 38 34.08	2.0375	3 0 50.6	16.413	7	14 16 51.10	2.0807	15 12 29.4	13.601
8	12 40 36.31	2.0369	3 17 14.6	16.385	8	14 18 56.00	2.0829	15 26 2.9	13.514
9	12 42 38.51	2.0364	3 33 36.8	16.355	9	14 21 1.03	2.0851	15 39 31.1	13.425
10	12 44 40.68	2.0359	3 49 57.2	16.324	10	14 23 6.20	2.0873	15 52 53.9	13.335
11	12 46 42.82	2.0355	4 6 15.6	16.291	11	14 25 11.51	2.0896	16 6 11.4	13.245
12	12 48 44.94	2.0351	4 22 32.1	16.257	12	14 27 16.96	2.0920	16 19 23.4	13.154
13	12 50 47.04	2.0348	4 38 46.5	16.222	13	14 29 22.55	2.0944	16 32 29.9	13.062
14	12 52 49.12	2.0346	4 54 58.7	16.185	14	14 31 28.28	2.0968	16 45 30.8	12.969
15	12 54 51.19	2.0345	5 11 8.6	16.147	15	14 33 34.16	2.0992	16 58 26.1	12.874
16	12 56 53.26	2.0344	5 27 16.2	16.108	16	14 35 40.18	2.1017	17 11 15.7	12.778
17	12 58 55.33	2.0345	5 43 21.5	16.067	17	14 37 46.35	2.1042	17 23 59.5	12.682
18	13 0 57.40	2.0346	5 59 24.3	16.025	18	14 39 52.68	2.1067	17 36 37.6	12.585
19	13 2 59.48	2.0347	6 15 24.5	15.982	19	14 41 59.16	2.1093	17 49 9.8	12.487
20	13 5 1.57	2.0350	6 31 22.0	15.937	20	14 44 5.79	2.1119	18 1 36.0	12.388
21	13 7 3.67	2.0353	6 47 16.8	15.891	21	14 46 12.58	2.1145	18 13 56.3	12.288
22	13 9 5.80	2.0356	7 3 8.8	15.844	22	14 48 19.53	2.1171	18 26 10.6	12.187
23	13 11 7.95	2.0361	S. 7 18 57.9	15.795	23	14 50 26.63	2.1197	S. 18 38 18.7	12.085
	TUESDAY 2.					THURSDAY 4.			
0	13 13 10.13	2.0366	S. 7 34 44.1	15.745	0	14 52 33.89	2.1223	S. 18 50 20.7	11.982
1	13 15 12.34	2.0371	7 50 27.3	15.694	1	14 54 41.31	2.1250	19 2 16.5	11.878
2	13 17 14.58	2.0377	8 6 7.4	15.641	2	14 56 48.89	2.1277	19 14 6.0	11.773
3	13 19 16.86	2.0384	8 21 44.3	15.587	3	14 58 56.64	2.1304	19 25 49.2	11.667
4	13 21 19.19	2.0392	8 37 17.9	15.532	4	15 1 4.55	2.1332	19 37 26.1	11.561
5	13 23 21.57	2.0400	8 52 48.2	15.476	5	15 3 12.62	2.1359	19 48 56.5	11.454
6	13 25 23.99	2.0409	9 8 15.1	15.419	6	15 5 20.86	2.1386	20 0 20.5	11.345
7	13 27 26.47	2.0418	9 23 38.5	15.360	7	15 7 29.26	2.1414	20 11 37.9	11.235
8	13 29 29.01	2.0427	9 38 58.3	15.300	8	15 9 37.83	2.1442	20 22 48.7	11.125
9	13 31 31.61	2.0438	9 54 14.6	15.239	9	15 11 46.56	2.1470	20 33 52.9	11.014
10	13 33 34.27	2.0450	10 9 27.1	15.177	10	15 13 55.46	2.1498	20 44 50.4	10.902
11	13 35 37.00	2.0462	10 24 35.8	15.114	11	15 16 4.53	2.1526	20 55 41.2	10.790
12	13 37 39.81	2.0474	10 39 40.7	15.049	12	15 18 13.77	2.1554	21 6 25.2	10.677
13	13 39 42.69	2.0487	10 54 41.7	14.983	13	15 20 23.18	2.1581	21 17 2.4	10.562
14	13 41 45.65	2.0501	11 9 38.6	14.916	14	15 22 32.75	2.1609	21 27 32.6	10.447
15	13 43 48.69	2.0515	11 24 31.5	14.847	15	15 24 42.49	2.1638	21 37 56.0	10.332
16	13 45 51.82	2.0529	11 39 20.3	14.777	16	15 26 52.40	2.1666	21 48 12.4	10.215
17	13 47 55.04	2.0544	11 54 4.9	14.707	17	15 29 2.47	2.1693	21 58 21.8	10.097
18	13 49 58.35	2.0560	12 8 45.2	14.636	18	15 31 12.71	2.1720	22 8 24.1	9.979
19	13 52 1.75	2.0576	12 23 21.2	14.563	19	15 33 23.12	2.1748	22 18 19.2	9.860
20	13 54 5.26	2.0592	12 37 52.7	14.489	20	15 35 33.70	2.1775	22 28 7.2	9.740
21	13 56 8.86	2.0609	12 52 19.7	14.414	21	15 37 44.44	2.1802	22 37 48.0	9.620
22	13 58 12.57	2.0627	13 6 42.2	14.337	22	15 39 55.34	2.1830	22 47 21.6	9.499
23	14 0 16.39	2.0645	13 21 0.1	14.259	23	15 42 6.40	2.1858	22 56 47.9	9.377
24	14 2 20.31	2.0663	S. 13 35 13.4	14.181	24	15 44 17.63	2.1885	S. 23 6 6.8	9.254

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	FRIDAY 5.					SUNDAY 7.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	15 44 17.63	2.1885	S.23 6 6.8	9.254	0	17 31 48.99	2.2724	S.27 58 29.8	2.775
1	15 46 29.02	2.1911	23 15 18.4	9.131	1	17 34 5.35	2.2727	28 1 12.0	2.633
2	15 48 40.57	2.1938	23 24 22.5	9.007	2	17 36 21.71	2.2729	28 3 45.7	2.491
3	15 50 52.28	2.1965	23 33 19.2	8.882	3	17 38 38.10	2.2731	28 6 10.9	2.349
4	15 53 4.15	2.1991	23 42 8.4	8.757	4	17 40 54.48	2.2732	28 8 27.6	2.207
5	15 55 16.17	2.2017	23 50 50.0	8.631	5	17 43 10.87	2.2732	28 10 35.7	2.065
6	15 57 28.35	2.2043	23 59 24.1	8.505	6	17 45 27.26	2.2731	28 12 35.3	1.923
7	15 59 40.68	2.2069	24 7 50.6	8.378	7	17 47 43.64	2.2729	28 14 26.4	1.781
8	16 1 53.17	2.2094	24 16 9.4	8.250	8	17 50 0.01	2.2727	28 16 9.0	1.639
9	16 4 5.81	2.2119	24 24 20.5	8.121	9	17 52 16.36	2.2724	28 17 43.0	1.497
10	16 6 18.60	2.2144	24 32 23.9	7.992	10	17 54 32.70	2.2720	28 19 8.6	1.356
11	16 8 31.53	2.2168	24 40 19.5	7.863	11	17 56 49.01	2.2716	28 20 25.6	1.214
12	16 10 44.61	2.2192	24 48 7.3	7.732	12	17 59 5.29	2.2711	28 21 34.1	1.071
13	16 12 57.84	2.2216	24 55 47.3	7.601	13	18 1 21.54	2.2705	28 22 34.1	0.929
14	16 15 11.20	2.2239	25 3 19.5	7.470	14	18 3 37.75	2.2698	28 23 25.6	0.787
15	16 17 24.70	2.2262	25 10 43.7	7.338	15	18 5 53.92	2.2691	28 24 8.6	0.646
16	16 19 38.34	2.2285	25 18 0.0	7.206	16	18 8 10.05	2.2683	28 24 43.1	0.505
17	16 21 52.12	2.2307	25 25 8.4	7.073	17	18 10 26.12	2.2674	28 25 9.2	0.364
18	16 24 6.03	2.2329	25 32 8.8	6.939	18	18 12 42.13	2.2664	28 25 26.8	0.223
19	16 26 20.07	2.2350	25 39 1.2	6.805	19	18 14 58.08	2.2653	28 25 36.0	−0.082
20	16 28 34.23	2.2370	25 45 45.5	6.671	20	18 17 13.97	2.2642	28 25 36.7	+0.058
21	16 30 48.51	2.2391	25 52 21.8	6.537	21	18 19 29.79	2.2630	28 25 29.0	0.198
22	16 33 2.92	2.2411	25 58 49.9	6.402	22	18 21 45.53	2.2618	28 25 12.8	0.338
23	16 35 17.44	2.2430	S.26 5 9.9	6.266	23	18 24 1.20	2.2605	S.28 24 48.3	0.478
	SATURDAY 6.					MONDAY 8.			
0	16 37 32.08	2.2449	S.26 11 21.8	6.130	0	18 26 16.79	2.2591	S.28 24 15.4	0.618
1	16 39 46.83	2.2468	26 17 25.5	5.993	1	18 28 32.29	2.2576	28 23 34.1	0.758
2	16 42 1.69	2.2486	26 23 21.0	5.856	2	18 30 47.70	2.2560	28 22 44.5	0.897
3	16 44 16.66	2.2503	26 29 8.3	5.719	3	18 33 3.02	2.2544	28 21 46.5	1.035
4	16 46 31.73	2.2520	26 34 47.3	5.581	4	18 35 18.23	2.2527	28 20 40.2	1.174
5	16 48 46.90	2.2536	26 40 18.1	5.443	5	18 37 33.34	2.2509	28 19 25.6	1.313
6	16 51 2.17	2.2552	26 45 40.5	5.305	6	18 39 48.35	2.2491	28 18 2.7	1.450
7	16 53 17.53	2.2567	26 50 54.7	5.167	7	18 42 3.24	2.2472	28 16 31.6	1.587
8	16 55 32.97	2.2581	26 56 0.6	5.028	8	18 44 18.02	2.2452	28 14 52.3	1.724
9	16 57 48.49	2.2595	27 0 58.1	4.889	9	18 46 32.67	2.2432	28 13 4.7	1.861
10	17 0 4.09	2.2608	27 5 47.2	4.750	10	18 48 47.21	2.2412	28 11 8.9	1.998
11	17 2 19.78	2.2620	27 10 28.0	4.610	11	18 51 1.62	2.2391	28 9 5.0	2.134
12	17 4 35.54	2.2633	27 15 0.4	4.470	12	18 53 15.89	2.2369	28 6 52.9	2.270
13	17 6 51.37	2.2645	27 19 24.4	4.330	13	18 55 30.03	2.2346	28 4 32.7	2.405
14	17 9 7.27	2.2655	27 23 39.9	4.189	14	18 57 44.04	2.2322	28 2 4.3	2.539
15	17 11 23.23	2.2665	27 27 47.0	4.048	15	18 59 57.90	2.2298	27 59 27.9	2.674
16	17 13 39.25	2.2674	27 31 45.7	3.908	16	19 2 11.61	2.2274	27 56 43.4	2.808
17	17 15 55.32	2.2683	27 35 35.9	3.767	17	19 4 25.18	2.2249	27 53 50.9	2.941
18	17 18 11.45	2.2691	27 39 17.6	3.625	18	19 6 38.59	2.2223	27 50 50.4	3.074
19	17 20 27.61	2.2698	27 42 50.9	3.484	19	19 8 51.85	2.2197	27 47 42.0	3.206
20	17 22 43.83	2.2705	27 46 15.7	3.343	20	19 11 4.95	2.2170	27 44 25.6	3.338
21	17 25 0.07	2.2711	27 49 32.0	3.201	21	19 13 17.88	2.2142	27 41 1.3	3.470
22	17 27 16.35	2.2716	27 52 39.8	3.059	22	19 15 30.65	2.2114	27 37 29.2	3.602
23	17 29 32.66	2.2720	27 55 39.1	2.917	23	19 17 43.25	2.2086	27 33 49.1	3.733
24	17 31 48.99	2.2724	S.27 58 29.8	2.775	24	19 19 55.68	2.2057	S.27 30 1.2	3.863

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	TUESDAY 9.					THURSDAY 11.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	19 19 55.68	2.2057	S.27 30 1.2	3.863	0	21 1 52.26	2.0362	S.22 6 3.0	9.385
1	19 22 7.93	2.2027	27 26 5.6	3.992	1	21 3 54.33	2.0326	21 56 37.0	9.483
2	19 24 20.01	2.1997	27 22 2.2	4.121	2	21 5 56.18	2.0290	21 47 5.0	9.581
3	19 26 31.91	2.1967	27 17 51.1	4.250	3	21 7 57.81	2.0254	21 37 27.2	9.678
4	19 28 43.63	2.1937	27 13 32.3	4.378	4	21 9 59.23	2.0219	21 27 43.6	9.774
5	19 30 55.16	2.1906	27 9 5.8	4.505	5	21 12 0.44	2.0184	21 17 54.3	9.870
6	19 33 6.50	2.1874	27 4 31.7	4.632	6	21 14 1.44	2.0149	21 7 59.3	9.965
7	19 35 17.65	2.1842	26 59 50.0	4.759	7	21 16 2.23	2.0114	20 57 58.6	10.059
8	19 37 28.61	2.1810	26 55 0.8	4.884	8	21 18 2.81	2.0079	20 47 52.3	10.152
9	19 39 39.37	2.1778	26 50 4.0	5.009	9	21 20 3.18	2.0045	20 37 40.4	10.244
10	19 41 49.93	2.1745	26 44 59.7	5.134	10	21 22 3.35	2.0011	20 27 23.0	10.336
11	19 44 0.30	2.1711	26 39 48.0	5.258	11	21 24 3.31	1.9977	20 17 0.1	10.427
12	19 46 10.47	2.1677	26 34 28.8	5.381	12	21 26 3.07	1.9943	20 6 31.8	10.517
13	19 48 20.43	2.1643	26 29 2.2	5.504	13	21 28 2.63	1.9910	19 55 58.1	10.607
14	19 50 30.19	2.1609	26 23 28.3	5.626	14	21 30 1.99	1.9878	19 45 19.0	10.696
15	19 52 39.74	2.1574	26 17 47.1	5.747	15	21 32 1.16	1.9845	19 34 34.5	10.784
16	19 54 49.08	2.1539	26 11 58.6	5.868	16	21 34 0.13	1.9812	19 23 44.8	10.872
17	19 56 58.21	2.1504	26 6 2.9	5.988	17	21 35 58.91	1.9780	19 12 49.9	10.959
18	19 59 7.13	2.1468	26 0 0.0	6.108	18	21 37 57.50	1.9749	19 1 49.8	11.045
19	20 1 15.84	2.1433	25 53 50.0	6.227	19	21 39 55.90	1.9718	18 50 44.6	11.130
20	20 3 24.33	2.1398	25 47 32.8	6.345	20	21 41 54.11	1.9687	18 39 34.3	11.214
21	20 5 32.61	2.1362	25 41 8.5	6.463	21	21 43 52.14	1.9657	18 28 18.9	11.298
22	20 7 40.67	2.1325	25 34 37.2	6.580	22	21 45 49.99	1.9627	18 16 58.5	11.382
23	20 9 48.51	2.1288	S.25 27 58.9	6.696	23	21 47 47.66	1.9597	S.18 5 33.1	11.464
	WEDNESDAY 10.					FRIDAY 12.			
0	20 11 56.13	2.1252	S.25 21 13.6	6.812	0	21 49 45.15	1.9568	S.17 54 2.8	11.544
1	20 14 3.53	2.1216	25 14 21.4	6.927	1	21 51 42.47	1.9539	17 42 27.7	11.625
2	20 16 10.72	2.1179	25 7 22.3	7.041	2	21 53 39.62	1.9510	17 30 47.8	11.706
3	20 18 17.68	2.1142	25 0 16.4	7.155	3	21 55 36.59	1.9482	17 19 3.1	11.785
4	20 20 24.42	2.1105	24 53 3.7	7.269	4	21 57 33.40	1.9455	17 7 13.6	11.863
5	20 22 30.93	2.1067	24 45 44.2	7.382	5	21 59 30.05	1.9428	16 55 19.4	11.941
6	20 24 37.22	2.1030	24 38 17.9	7.493	6	22 1 26.53	1.9401	16 43 20.6	12.019
7	20 26 43.29	2.0993	24 30 44.9	7.604	7	22 3 22.85	1.9375	16 31 17.2	12.096
8	20 28 49.14	2.0955	24 23 5.3	7.715	8	22 5 19.02	1.9349	16 19 9.2	12.171
9	20 30 54.76	2.0918	24 15 19.1	7.825	9	22 7 15.04	1.9324	16 6 56.7	12.246
10	20 33 0.16	2.0881	24 7 26.4	7.934	10	22 9 10.91	1.9299	15 54 39.7	12.320
11	20 35 5.33	2.0843	23 59 27.2	8.042	11	22 11 6.63	1.9274	15 42 18.3	12.393
12	20 37 10.28	2.0806	23 51 21.5	8.149	12	22 13 2.20	1.9250	15 29 52.6	12.466
13	20 39 15.00	2.0769	23 43 9.3	8.256	13	22 14 57.63	1.9227	15 17 22.5	12.538
14	20 41 19.50	2.0731	23 34 50.8	8.363	14	22 16 52.93	1.9204	15 4 48.1	12.609
15	20 43 23.78	2.0694	23 26 25.9	8.468	15	22 18 48.09	1.9182	14 52 9.5	12.679
16	20 45 27.83	2.0657	23 17 54.7	8.572	16	22 20 43.11	1.9161	14 39 26.6	12.749
17	20 47 31.66	2.0620	23 9 17.2	8.676	17	22 22 38.01	1.9139	14 26 39.6	12.818
18	20 49 35.27	2.0583	23 0 33.5	8.780	18	22 24 32.79	1.9118	14 13 48.5	12.886
19	20 51 38.65	2.0546	22 51 43.6	8.883	19	22 26 27.44	1.9098	14 0 53.3	12.953
20	20 53 41.81	2.0509	22 42 47.6	8.985	20	22 28 21.97	1.9079	13 47 54.1	13.019
21	20 55 44.75	2.0472	22 33 45.5	9.086	21	22 30 16.39	1.9060	13 34 51.0	13.085
22	20 57 47.47	2.0436	22 24 37.3	9.186	22	22 32 10.69	1.9041	13 21 43.9	13.151
23	20 59 49.97	2.0399	22 15 23.1	9.286	23	22 34 4.88	1.9023	13 8 32.9	13.215
24	21 1 52.26	2.0362	S.22 6 3.0	9.385	24	22 35 58.97	1.9006	S.12 55 18.1	13.278

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	SATURDAY 13.					MONDAY 15.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	22 35 58.97	1.9006	S. 12 55 18.1	13.278	0	0 6 24.25	1.8931	S. 1 20 16.9	15.347
1	22 37 52.95	1.8989	12 41 59.5	13.341	1	0 8 17.88	1.8946	1 4 55.5	15.368
2	22 39 46.84	1.8972	12 28 37.2	13.403	2	0 10 11.61	1.8963	0 49 32.8	15.387
3	22 41 40.63	1.8957	12 15 11.2	13.464	3	0 12 5.44	1.8981	0 34 9.0	15.405
4	22 43 34.33	1.8942	12 1 41.6	13.524	4	0 13 59.38	1.8999	0 18 44.1	15.423
5	22 45 27.94	1.8927	11 48 8.3	13.584	5	0 15 53.43	1.9018	S. 0 3 18.2	15.440
6	22 47 21.46	1.8914	11 34 31.5	13.643	6	0 17 47.59	1.9038	N. 0 12 8.6	15.455
7	22 49 14.90	1.8901	11 20 51.2	13.701	7	0 19 41.87	1.9058	0 27 36.4	15.469
8	22 51 8.27	1.8888	11 7 7.4	13.758	8	0 21 36.28	1.9079	0 43 5.0	15.483
9	22 53 1.56	1.8876	10 53 20.2	13.814	9	0 23 30.82	1.9101	0 58 34.4	15.496
10	22 54 54.78	1.8865	10 39 29.7	13.870	10	0 25 25.49	1.9124	1 14 4.5	15.507
11	22 56 47.94	1.8854	10 25 35.8	13.925	11	0 27 20.30	1.9148	1 29 35.2	15.517
12	22 58 41.03	1.8843	10 11 38.7	13.979	12	0 29 15.26	1.9172	1 45 6.4	15.525
13	23 0 34.06	1.8834	9 57 38.4	14.032	13	0 31 10.36	1.9196	2 0 38.1	15.532
14	23 2 27.04	1.8826	9 43 34.9	14.084	14	0 33 5.61	1.9222	2 16 10.3	15.539
15	23 4 19.97	1.8818	9 29 28.3	14.136	15	0 35 1.02	1.9249	2 31 42.8	15.544
16	23 6 12.85	1.8810	9 15 18.6	14.187	16	0 36 56.59	1.9276	2 47 15.6	15.548
17	23 8 5.68	1.8803	9 1 5.8	14.237	17	0 38 52.33	1.9304	3 2 48.7	15.552
18	23 9 58.47	1.8797	8 46 50.1	14.286	18	0 40 48.24	1.9333	3 18 21.9	15.554
19	23 11 51.23	1.8791	8 32 31.5	14.334	19	0 42 44.33	1.9363	3 33 55.1	15.554
20	23 13 43.96	1.8786	8 18 10.0	14.381	20	0 44 40.60	1.9394	3 49 28.4	15.554
21	23 15 36.66	1.8782	8 3 45.8	14.428	21	0 46 37.06	1.9426	4 5 1.7	15.553
22	23 17 29.33	1.8778	7 49 18.7	14.474	22	0 48 33.71	1.9458	4 20 34.8	15.550
23	23 19 21.99	1.8775	S. 7 34 48.9	14.518	23	0 50 30.55	1.9491	N. 4 36 7.7	15.546
	SUNDAY 14.					TUESDAY 16.			
0	23 21 14.63	1.8773	S. 7 20 16.5	14.562	0	0 52 27.59	1.9525	N. 4 51 40.3	15.541
1	23 23 7.26	1.8771	7 5 41.5	14.605	1	0 54 24.84	1.9559	5 7 12.6	15.534
2	23 24 59.88	1.8770	6 51 3.9	14.647	2	0 56 22.29	1.9594	5 22 44.4	15.526
3	23 26 52.50	1.8770	6 36 23.7	14.689	3	0 58 19.96	1.9630	5 38 15.7	15.517
4	23 28 45.12	1.8770	6 21 41.1	14.730	4	1 0 17.85	1.9667	5 53 46.4	15.507
5	23 30 37.74	1.8771	6 6 56.1	14.770	5	1 2 15.96	1.9705	6 9 16.5	15.495
6	23 32 30.37	1.8773	5 52 8.8	14.809	6	1 4 14.30	1.9743	6 24 45.9	15.482
7	23 34 23.02	1.8776	5 37 19.1	14.847	7	1 6 12.88	1.9782	6 40 14.4	15.468
8	23 36 15.68	1.8780	5 22 27.2	14.884	8	1 8 11.69	1.9822	6 55 42.0	15.452
9	23 38 8.37	1.8784	5 7 33.1	14.920	9	1 10 10.74	1.9863	7 11 8.7	15.436
10	23 40 1.08	1.8788	4 52 36.9	14.955	10	1 12 10.04	1.9905	7 26 34.3	15.418
11	23 41 53.82	1.8792	4 37 38.6	14.989	11	1 14 9.59	1.9948	7 41 58.8	15.398
12	23 43 46.60	1.8798	4 22 38.3	15.022	12	1 16 9.40	1.9991	7 57 22.1	15.377
13	23 45 39.42	1.8806	4 7 36.0	15.054	13	1 18 9.47	2.0034	8 12 44.1	15.355
14	23 47 32.28	1.8814	3 52 31.8	15.086	14	1 20 9.81	2.0079	8 28 4.7	15.331
15	23 49 25.18	1.8822	3 37 25.8	15.117	15	1 22 10.42	2.0125	8 43 23.8	15.306
16	23 51 18.14	1.8831	3 22 17.9	15.146	16	1 24 11.30	2.0171	8 58 41.4	15.280
17	23 53 11.16	1.8841	3 7 8.2	15.174	17	1 26 12.46	2.0218	9 13 57.4	15.252
18	23 55 4.24	1.8852	2 51 56.9	15.202	18	1 28 13.91	2.0266	9 29 11.6	15.223
19	23 56 57.38	1.8864	2 36 44.0	15.229	19	1 30 15.64	2.0314	9 44 24.0	15.192
20	23 58 50.60	1.8876	2 21 29.5	15.255	20	1 32 17.67	2.0363	9 59 34.6	15.159
21	0 0 43.89	1.8888	2 6 13.5	15.280	21	1 34 20.00	2.0413	10 14 43.2	15.125
22	0 2 37.26	1.8901	1 50 56.0	15.303	22	1 36 22.63	2.0464	10 29 49.7	15.090
23	0 4 30.71	1.8916	1 35 37.1	15.325	23	1 38 25.57	2.0516	10 44 54.0	15.053
24	0 6 24.25	1.8931	S. 1 20 16.9	15.347	24	1 40 28.82	2.0568	N. 10 59 56.1	15.015

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	WEDNESDAY 17.					FRIDAY 19.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	1 40 28.82	2.0568	N.10 59 56.1	15.015	0	3 26 25.79	2.3755	N.21 45 43.7	11.227
1	1 42 32.39	2.0621	11 14 55.9	14.974	1	3 28 48.55	2.3829	21 56 53.7	11.104
2	1 44 36.28	2.0675	11 29 53.2	14.933	2	3 31 11.75	2.3903	22 7 56.3	10.980
3	1 46 40.49	2.0729	11 44 48.0	14.891	3	3 33 35.39	2.3977	22 18 51.3	10.854
4	1 48 45.03	2.0784	11 59 40.2	14.847	4	3 35 59.47	2.4051	22 29 38.7	10.726
5	1 50 49.90	2.0840	12 14 29.7	14.801	5	3 38 23.99	2.4124	22 40 18.4	10.597
6	1 52 55.11	2.0897	12 29 16.4	14.754	6	3 40 48.96	2.4197	22 50 50.3	10.465
7	1 55 0.66	2.0955	12 44 0.2	14.705	7	3 43 14.36	2.4271	23 1 14.3	10.331
8	1 57 6.56	2.1013	12 58 41.0	14.654	8	3 45 40.20	2.4344	23 11 30.2	10.196
9	1 59 12.82	2.1071	13 13 18.7	14.602	9	3 48 6.48	2.4416	23 21 37.9	10.060
10	2 1 19.43	2.1130	13 27 53.3	14.549	10	3 50 33.19	2.4488	23 31 37.4	9.922
11	2 3 26.39	2.1190	13 42 24.6	14.493	11	3 53 0.33	2.4560	23 41 28.5	9.781
12	2 5 33.72	2.1251	13 56 52.5	14.435	12	3 55 27.90	2.4631	23 51 11.1	9.638
13	2 7 41.41	2.1313	14 11 16.9	14.377	13	3 57 55.90	2.4702	24 0 45.1	9.494
14	2 9 49.47	2.1375	14 25 37.8	14.317	14	4 0 24.32	2.4773	24 10 10.4	9.349
15	2 11 57.91	2.1437	14 39 55.0	14.255	15	4 2 53.16	2.4843	24 19 27.0	9.202
16	2 14 6.72	2.1500	14 54 8.4	14.192	16	4 5 22.42	2.4912	24 28 34.7	9.053
17	2 16 15.91	2.1564	15 8 17.9	14.126	17	4 7 52.10	2.4980	24 37 33.4	8.902
18	2 18 25.49	2.1629	15 22 23.5	14.059	18	4 10 22.19	2.5048	24 46 23.0	8.750
19	2 20 35.46	2.1694	15 36 25.0	13.991	19	4 12 52.69	2.5116	24 55 3.4	8.596
20	2 22 45.82	2.1758	15 50 22.3	13.920	20	4 15 23.58	2.5183	25 3 34.5	8.440
21	2 24 56.57	2.1824	16 4 15.3	13.848	21	4 17 54.88	2.5249	25 11 56.3	8.283
22	2 27 7.72	2.1892	16 18 4.0	13.774	22	4 20 26.57	2.5314	25 20 8.6	8.124
23	2 29 19.27	2.1959	N.16 31 48.2	13.698	23	4 22 58.65	2.5378	N.25 28 11.3	7.964
	THURSDAY 18.					SATURDAY 20.			
0	2 31 31.23	2.2026	N.16 45 27.8	13.621	0	4 25 31.11	2.5442	N.25 36 4.3	7.802
1	2 33 43.59	2.2095	16 59 2.7	13.542	1	4 28 3.95	2.5505	25 43 47.5	7.638
2	2 35 56.37	2.2164	17 12 32.7	13.461	2	4 30 37.17	2.5567	25 51 20.9	7.473
3	2 38 9.56	2.2233	17 25 57.9	13.378	3	4 33 10.76	2.5628	25 58 44.4	7.307
4	2 40 23.16	2.2303	17 39 18.1	13.294	4	4 35 44.72	2.5688	26 5 57.8	7.139
5	2 42 37.18	2.2373	17 52 33.2	13.208	5	4 38 19.03	2.5747	26 13 1.1	6.970
6	2 44 51.63	2.2443	18 5 43.0	13.120	6	4 40 53.69	2.5805	26 19 54.2	6.800
7	2 47 6.50	2.2514	18 18 47.5	13.030	7	4 43 28.69	2.5862	26 26 37.0	6.627
8	2 49 21.79	2.2585	18 31 46.6	12.938	8	4 46 4.03	2.5918	26 33 9.4	6.453
9	2 51 37.51	2.2656	18 44 40.2	12.845	9	4 48 39.71	2.5973	26 39 31.4	6.279
10	2 53 53.66	2.2728	18 57 28.1	12.750	10	4 51 15.71	2.6026	26 45 42.9	6.103
11	2 56 10.25	2.2800	19 10 10.2	12.653	11	4 53 52.02	2.6078	26 51 43.7	5.925
12	2 58 27.27	2.2872	19 22 46.4	12.554	12	4 56 28.65	2.6129	26 57 33.9	5.746
13	3 0 44.72	2.2945	19 35 16.6	12.453	13	4 59 5.58	2.6179	27 3 13.3	5.566
14	3 3 2.61	2.3019	19 47 40.8	12.351	14	5 1 42.80	2.6228	27 8 41.9	5.385
15	3 5 20.94	2.3092	19 59 58.8	12.247	15	5 4 20.31	2.6275	27 13 59.5	5.203
16	3 7 39.71	2.3165	20 12 10.5	12.141	16	5 6 58.09	2.6320	27 19 6.2	5.020
17	3 9 58.92	2.3239	20 24 15.8	12.034	17	5 9 36.14	2.6364	27 24 1.9	4.835
18	3 12 18.57	2.3313	20 36 14.5	11.924	18	5 12 14.45	2.6407	27 28 46.5	4.649
19	3 14 38.67	2.3387	20 48 6.6	11.812	19	5 14 53.02	2.6448	27 33 19.8	4.463
20	3 16 59.21	2.3460	20 59 52.0	11.699	20	5 17 31.83	2.6488	27 37 42.0	4.276
21	3 19 20.19	2.3533	21 11 30.5	11.584	21	5 20 10.87	2.6526	27 41 52.9	4.087
22	3 21 41.61	2.3607	21 23 2.0	11.467	22	5 22 50.14	2.6562	27 45 52.5	3.898
23	3 24 3.48	2.3681	21 34 26.4	11.348	23	5 25 29.62	2.6597	27 49 40.7	3.708
24	3 26 25.79	2.3755	N.21 45 43.7	11.227	24	5 28 9.31	2.6631	N.27 53 17.4	3.516

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	SUNDAY 21.					TUESDAY 23.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	5 28 9.31	2.6631	N.27 53 17.4	3.516	0	7 36 30.72	2.6190	N.26 56 23.2	5.798
1	5 30 49.19	2.6663	27 56 42.6	3.324	1	7 39 7.72	2.6142	26 50 29.9	5.978
2	5 33 29.26	2.6693	27 59 56.3	3.132	2	7 41 44.42	2.6093	26 44 25.8	6.157
3	5 36 9.51	2.6723	28 2 58.5	2.939	3	7 44 20.82	2.6042	26 38 11.0	6.335
4	5 38 49.92	2.6750	28 5 49.0	2.745	4	7 46 56.92	2.5990	26 31 45.6	6.512
5	5 41 30.49	2.6774	28 8 27.9	2.550	5	7 49 32.70	2.5937	26 25 9.6	6.687
6	5 44 11.20	2.6797	28 10 55.1	2.355	6	7 52 8.17	2.5883	26 18 23.1	6.861
7	5 46 52.05	2.6818	28 13 10.5	2.160	7	7 54 43.31	2.5829	26 11 26.2	7.034
8	5 49 33.02	2.6838	28 15 14.1	1.963	8	7 57 18.12	2.5774	26 4 19.0	7.205
9	5 52 14.11	2.6856	28 17 6.0	1.766	9	7 59 52.59	2.5717	25 57 1.6	7.375
10	5 54 55.30	2.6872	28 18 46.1	1.569	10	8 2 26.72	2.5659	25 49 34.0	7.544
11	5 57 36.58	2.6887	28 20 14.3	1.371	11	8 5 0.50	2.5601	25 41 56.3	7.711
12	6 0 17.94	2.6900	28 21 30.7	1.174	12	8 7 33.93	2.5542	25 34 8.6	7.877
13	6 2 59.37	2.6911	28 22 35.2	0.976	13	8 10 7.00	2.5482	25 26 11.0	8.042
14	6 5 40.86	2.6920	28 23 27.8	0.777	14	8 12 39.71	2.5421	25 18 3.6	8.205
15	6 8 22.40	2.6927	28 24 8.6	0.579	15	8 15 12.05	2.5359	25 9 46.5	8.366
16	6 11 3.98	2.6932	28 24 37.4	0.381	16	8 17 44.02	2.5297	25 1 19.7	8.526
17	6 13 45.59	2.6936	28 24 54.3	+0.183	17	8 20 15.61	2.5234	24 52 43.4	8.685
18	6 16 27.22	2.6938	28 24 59.2	−0.017	18	8 22 46.83	2.5170	24 43 57.6	8.842
19	6 19 8.84	2.6937	28 24 52.2	0.216	19	8 25 17.66	2.5106	24 35 2.5	8.997
20	6 21 50.46	2.6935	28 24 33.3	0.415	20	8 27 48.11	2.5042	24 25 58.1	9.150
21	6 24 32.06	2.6932	28 24 2.5	0.613	21	8 30 18.17	2.4977	24 16 44.5	9.302
22	6 27 13.64	2.6926	28 23 19.8	0.812	22	8 32 47.83	2.4911	24 7 21.8	9.453
23	6 29 55.18	2.6918	N.28 22 25.1	1.011	23	8 35 17.10	2.4845	N.23 57 50.1	9.602
	MONDAY 22.					WEDNESDAY 24.			
0	6 32 36.67	2.6909	N.28 21 18.5	1.209	0	8 37 45.98	2.4779	N.23 48 9.5	9.749
1	6 35 18.10	2.6898	28 20 0.1	1.407	1	8 40 14.46	2.4712	23 38 20.1	9.895
2	6 37 59.45	2.6885	28 18 29.8	1.604	2	8 42 42.53	2.4645	23 28 22.1	10.039
3	6 40 40.72	2.6871	28 16 47.6	1.801	3	8 45 10.20	2.4578	23 18 15.5	10.181
4	6 43 21.90	2.6855	28 14 53.6	1.998	4	8 47 37.47	2.4510	23 8 0.3	10.322
5	6 46 2.98	2.6837	28 12 47.8	2.195	5	8 50 4.33	2.4443	22 57 36.7	10.462
6	6 48 43.94	2.6817	28 10 30.2	2.391	6	8 52 30.79	2.4376	22 47 4.9	10.600
7	6 51 24.78	2.6795	28 8 0.9	2.586	7	8 54 56.83	2.4307	22 36 24.8	10.735
8	6 54 5.49	2.6772	28 5 19.8	2.782	8	8 57 22.47	2.4238	22 25 36.6	10.869
9	6 56 46.05	2.6749	28 2 27.1	2.977	9	8 59 47.70	2.4170	22 14 40.4	11.002
10	6 59 26.46	2.6723	27 59 22.7	3.170	10	9 2 12.52	2.4102	22 3 36.4	11.133
11	7 2 6.70	2.6693	27 56 6.7	3.363	11	9 4 36.92	2.4033	21 52 24.6	11.262
12	7 4 46.77	2.6663	27 52 39.1	3.556	12	9 7 0.91	2.3964	21 41 5.0	11.389
13	7 7 26.66	2.6632	27 49 0.0	3.748	13	9 9 24.49	2.3896	21 29 37.8	11.515
14	7 10 6.35	2.6599	27 45 9.4	3.939	14	9 11 47.67	2.3828	21 18 3.1	11.639
15	7 12 45.84	2.6564	27 41 7.3	4.129	15	9 14 10.43	2.3760	21 6 21.1	11.761
16	7 15 25.12	2.6528	27 36 33.8	4.318	16	9 16 32.78	2.3692	20 54 31.8	11.882
17	7 18 4.18	2.6491	27 32 29.0	4.506	17	9 18 54.73	2.3624	20 42 35.3	12.001
18	7 20 43.01	2.6452	27 27 53.0	4.694	18	9 21 16.27	2.3556	20 30 31.7	12.118
19	7 23 21.61	2.6412	27 23 5.8	4.881	19	9 23 37.40	2.3488	20 18 21.1	12.233
20	7 25 59.96	2.6372	27 18 7.4	5.067	20	9 25 58.13	2.3421	20 6 3.7	12.347
21	7 28 38.05	2.6329	27 12 57.8	5.252	21	9 28 18.46	2.3354	19 53 39.5	12.459
22	7 31 15.88	2.6283	27 7 37.2	5.435	22	9 30 38.39	2.3287	19 41 8.6	12.569
23	7 33 53.44	2.6237	27 2 5.7	5.617	23	9 32 57.91	2.3220	19 28 31.1	12.678
24	7 36 30.72	2.6190	N.26 56 23.2	5.798	24	9 35 17.04	2.3154	N.19 15 47.2	12.785

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	THURSDAY 25.					SATURDAY 27.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	9 35 17.04	2.3154	N.19 15 47.2	12.785	0	11 19 48.68	2.0661	N. 7 30 37.5	15.983
1	9 37 35.77	2.3089	19 2 56.9	12.890	1	11 21 52.55	2.0628	7 14 37.7	16.011
2	9 39 54.10	2.3023	18 50 0.4	12.993	2	11 23 56.22	2.0595	6 58 36.2	16.038
3	9 42 12.04	2.2958	18 36 57.7	13.095	3	11 25 59.69	2.0563	6 42 33.1	16.064
4	9 44 29.60	2.2893	18 23 49.0	13.195	4	11 28 2.97	2.0532	6 26 28.5	16.088
5	9 46 46.77	2.2828	18 10 34.3	13.293	5	11 30 6.07	2.0501	6 10 22.5	16.111
6	9 49 3.55	2.2765	17 57 13.7	13.390	6	11 32 8.99	2.0472	5 54 15.2	16.133
7	9 51 19.95	2.2702	17 43 47.4	13.485	7	11 34 11.74	2.0444	5 38 6.6	16.152
8	9 53 35.97	2.2639	17 30 15.5	13.578	8	11 36 14.32	2.0416	5 21 56.8	16.171
9	9 55 51.62	2.2577	17 16 38.0	13.670	9	11 38 16.73	2.0389	5 5 45.9	16.189
10	9 58 6.89	2.2515	17 2 55.1	13.760	10	11 40 18.98	2.0363	4 49 34.1	16.205
11	10 0 21.79	2.2453	16 49 6.8	13.848	11	11 42 21.08	2.0338	4 33 21.4	16.219
12	10 2 36.33	2.2392	16 35 13.3	13.935	12	11 44 23.03	2.0314	4 17 7.8	16.232
13	10 4 50.50	2.2332	16 21 14.6	14.020	13	11 46 24.83	2.0290	4 0 53.5	16.244
14	10 7 4.32	2.2272	16 7 10.9	14.103	14	11 48 26.50	2.0267	3 44 38.5	16.254
15	10 9 17.78	2.2213	15 53 2.3	14.184	15	11 50 28.04	2.0245	3 28 23.0	16.263
16	10 11 30.88	2.2155	15 38 48.9	14.264	16	11 52 29.45	2.0224	3 12 7.0	16.271
17	10 13 43.63	2.2097	15 24 30.7	14.342	17	11 54 30.73	2.0204	2 55 50.6	16.277
18	10 15 56.04	2.2039	15 10 7.8	14.418	18	11 56 31.89	2.0184	2 39 33.8	16.282
19	10 18 8.11	2.1982	14 55 40.4	14.494	19	11 58 32.94	2.0165	2 23 16.8	16.285
20	10 20 19.84	2.1927	14 41 8.5	14.568	20	12 0 33.88	2.0148	2 6 59.6	16.287
21	10 22 31.23	2.1872	14 26 32.3	14.639	21	12 2 34.72	2.0132	1 50 42.3	16.288
22	10 24 42.29	2.1817	14 11 51.8	14.709	22	12 4 35.47	2.0116	1 34 25.0	16.287
23	10 26 53.03	2.1763	N.13 57 7.2	14.777	23	12 6 36.12	2.0100	N. 1 18 7.9	16.285
	FRIDAY 26.					SUNDAY 28.			
0	10 29 3.45	2.1710	N.13 42 18.6	14.844	0	12 8 36.67	2.0086	N. 1 1 50.8	16.282
1	10 31 13.55	2.1658	13 27 26.0	14.910	1	12 10 37.14	2.0073	0 45 34.0	16.277
2	10 33 23.34	2.1606	13 12 29.5	14.973	2	12 12 37.54	2.0060	0 29 17.5	16.271
3	10 35 32.82	2.1554	12 57 29.2	15.035	3	12 14 37.86	2.0048	N. 0 13 1.4	16.264
4	10 37 41.99	2.1504	12 42 25.2	15.096	4	12 16 38.11	2.0037	S. 0 3 14.2	16.256
5	10 39 50.86	2.1455	12 27 17.7	15.155	5	12 18 38.30	2.0027	0 19 29.3	16.246
6	10 41 59.44	2.1406	12 12 6.7	15.212	6	12 20 38.43	2.0017	0 35 43.7	16.234
7	10 44 7.73	2.1358	11 56 52.3	15.268	7	12 22 38.50	2.0008	0 51 57.4	16.222
8	10 46 15.73	2.1310	11 41 34.6	15.322	8	12 24 38.52	2.0000	1 8 10.3	16.209
9	10 48 23.45	2.1263	11 26 13.7	15.374	9	12 26 38.50	1.9993	1 24 22.4	16.194
10	10 50 30.90	2.1218	11 10 49.7	15.425	10	12 28 38.44	1.9987	1 40 33.6	16.177
11	10 52 38.07	2.1173	10 55 22.6	15.475	11	12 30 38.35	1.9981	1 56 43.7	16.159
12	10 54 44.97	2.1128	10 39 52.6	15.523	12	12 32 38.22	1.9976	2 12 52.7	16.140
13	10 56 51.61	2.1085	10 24 19.8	15.569	13	12 34 38.06	1.9972	2 29 0.5	16.120
14	10 58 57.99	2.1043	10 8 44.2	15.614	14	12 36 37.89	1.9969	2 45 7.1	16.099
15	11 1 4.12	2.1001	9 53 6.0	15.658	15	12 38 37.69	1.9967	3 1 12.4	16.076
16	11 3 10.00	2.0960	9 37 25.2	15.700	16	12 40 37.48	1.9965	3 17 16.2	16.052
17	11 5 15.64	2.0920	9 21 42.0	15.740	17	12 42 37.27	1.9964	3 33 18.6	16.027
18	11 7 21.04	2.0880	9 5 56.4	15.779	18	12 44 37.05	1.9964	3 49 19.4	16.000
19	11 9 26.20	2.0841	8 50 8.5	15.817	19	12 46 36.84	1.9965	4 5 18.6	15.972
20	11 11 31.13	2.0803	8 34 18.4	15.854	20	12 48 36.63	1.9966	4 21 16.0	15.943
21	11 13 35.84	2.0766	8 18 26.1	15.888	21	12 50 36.43	1.9968	4 37 11.7	15.913
22	11 15 40.33	2.0730	8 2 31.8	15.921	22	12 52 36.25	1.9971	4 53 5.5	15.881
23	11 17 44.61	2.0695	7 46 35.6	15.953	23	12 54 36.08	1.9974	5 8 57.4	15.848
24	11 19 48.68	2.0661	N. 7 30 37.5	15.983	24	12 56 35.94	1.9978	S. 5 24 47.3	15.814

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	MONDAY 29.			
	h m s	s	° ′ ″	″
0	12 56 35.94	1.9978	S. 5 24 47.3	15.814
1	12 58 35.84	1.9984	5 40 35.0	15.778
2	13 0 35.76	1.9989	5 56 20.6	15.741
3	13 2 35.71	1.9995	6 12 3.9	15.703
4	13 4 35.70	2.0003	6 27 45.0	15.665
5	13 6 35.74	2.0011	6 43 23.7	15.624
6	13 8 35.83	2.0020	6 58 59.9	15.583
7	13 10 35.98	2.0029	7 14 33.6	15.540
8	13 12 36.18	2.0038	7 30 4.7	15.496
9	13 14 36.44	2.0048	7 45 33.1	15.450
10	13 16 36.76	2.0060	8 0 58.7	15.403
11	13 18 37.16	2.0072	8 16 21.5	15.357
12	13 20 37.63	2.0085	8 31 41.5	15.308
13	13 22 38.18	2.0098	8 46 58.5	15.258
14	13 24 38.81	2.0112	9 2 12.4	15.206
15	13 26 39.52	2.0126	9 17 23.2	15.153
16	13 28 40.32	2.0142	9 32 30.8	15.099
17	13 30 41.22	2.0158	9 47 35.1	15.044
18	13 32 42.21	2.0173	10 2 36.1	14.989
19	13 34 43.30	2.0190	10 17 33.8	14.932
20	13 36 44.49	2.0208	10 32 27.9	14.873
21	13 38 45.79	2.0226	10 47 18.5	14.813
22	13 40 47.20	2.0245	11 2 5.5	14.753
23	13 42 48.73	2.0264	S. 11 16 48.8	14.691
	TUESDAY 30.			
0	13 44 50.37	2.0283	S. 11 31 28.4	14.628
1	13 46 52.13	2.0304	11 46 4.1	14.563
2	13 48 54.02	2.0325	12 0 35.9	14.498
3	13 50 56.03	2.0346	12 15 3.8	14.432
4	13 52 58.17	2.0368	12 29 27.7	14.363
5	13 55 0.45	2.0391	12 43 47.4	14.293
6	13 57 2.86	2.0413	12 58 2.9	14.223
7	13 59 5.41	2.0437	13 12 14.2	14.152
8	14 1 8.10	2.0461	13 26 21.2	14.080
9	14 3 10.94	2.0486	13 40 23.8	14.007
10	14 5 13.93	2.0511	13 54 22.0	13.932
11	14 7 17.07	2.0536	14 8 15.6	13.856
12	14 9 20.36	2.0562	14 22 4.7	13.779
13	14 11 23.81	2.0588	14 35 49.1	13.701
14	14 13 27.41	2.0614	14 49 28.8	13.622
15	14 15 31.18	2.0642	15 3 3.7	13.541
16	14 17 35.11	2.0668	15 16 33.7	13.459
17	14 19 39.20	2.0697	15 29 58.8	13.377
18	14 21 43.47	2.0725	15 43 18.9	13.293
19	14 23 47.90	2.0753	15 56 34.0	13.209
20	14 25 52.50	2.0782	16 9 44.0	13.123
21	14 27 57.28	2.0812	16 22 48.8	13.036
22	14 30 2.24	2.0842	16 35 48.3	12.948
23	14 32 7.38	2.0871	16 48 42.5	12.858
24	14 34 12.68	2.0901	S. 17 1 31.2	12.768

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	WEDNESDAY, MAY 1.			
	h m s	s	° ′ ″	″
0	14 34 12.68	2.0901	S. 17 1 31.2	12.768

PHASES OF THE MOON.

			d	h	m
○	Full Moon . . .	Apr.	1	10	4.6
☾	Last Quarter		9	3	23.8
●	New Moon		16	23	40.2
☽	First Quarter		23	20	47.2
○	Full Moon		30	22	19.4

			d	h
☾	Apogee	Apr.	9	12.8
☾	Perigee		22	10.3

MAY, 1912.

AT GREENWICH APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S					Sidereal Time of Semidiameter Passing Meridian.	Equation of Time, to be Subtracted from Apparent Time.
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.	Semidiameter.		
		h m s	s	° ′ ″	″	′ ″	s	m s
Wed.	1	2 33 13.08	9.537	N.15 3 4.9	+45.41	15 53.90	66.03	2 57.18
Thur.	2	2 37 2.24	9.560	15 21 7.3	44.78	15 53.66	66.11	3 4.56
Frid.	3	2 40 51.95	9.583	15 38 54.5	44.15	15 53.43	66.19	3 11.39
Sat.	4	2 44 42.22	9.606	15 56 26.4	+43.50	15 53.19	66.27	3 17.66
SUN.	5	2 48 33.06	9.630	16 13 42.5	42.84	15 52.96	66.35	3 23.36
Mon.	6	2 52 24.47	9.654	16 30 42.6	42.17	15 52.73	66.43	3 28.49
Tues.	7	2 56 16.46	9.678	16 47 26.3	+41.48	15 52.50	66.51	3 33.04
Wed.	8	3 0 9.04	9.702	17 3 53.4	40.78	15 52.28	66.59	3 37.01
Thur.	9	3 4 2.21	9.727	17 20 3.5	40.06	15 52.06	66.67	3 40.39
Frid.	10	3 7 55.96	9.752	17 35 56.4	+39.33	15 51.84	66.75	3 43.18
Sat.	11	3 11 50.30	9.777	17 51 31.8	38.60	15 51.62	66.83	3 45.39
SUN.	12	3 15 45.24	9.802	18 6 49.3	37.85	15 51.40	66.91	3 47.00
Mon.	13	3 19 40.78	9.826	18 21 48.6	+37.09	15 51.19	66.99	3 48.02
Tues.	14	3 23 36.91	9.851	18 36 29.5	36.32	15 50.98	67.08	3 48.45
Wed.	15	3 27 33.62	9.875	18 50 51.6	35.53	15 50.78	67.16	3 48.29
Thur.	16	3 31 30.91	9.899	19 4 54.7	+34.73	15 50.58	67.24	3 47.56
Frid.	17	3 35 28.77	9.923	19 18 38.4	33.92	15 50.39	67.32	3 46.26
Sat.	18	3 39 27.20	9.946	19 32 2.5	33.09	15 50.20	67.40	3 44.40
SUN.	19	3 43 26.17	9.969	19 45 6.5	+32.25	15 50.02	67.48	3 42.00
Mon.	20	3 47 25.67	9.991	19 57 50.3	31.40	15 49.84	67.56	3 39.06
Tues.	21	3 51 25.70	10.013	20 10 13.7	30.54	15 49.66	67.64	3 35.59
Wed.	22	3 55 26.26	10.034	20 22 16.3	+29.67	15 49.49	67.71	3 31.59
Thur.	23	3 59 27.33	10.055	20 33 57.9	28.79	15 49.32	67.79	3 27.09
Frid.	24	4 3 28.90	10.076	20 45 18.3	27.90	15 49.15	67.86	3 22.09
Sat.	25	4 7 30.96	10.096	20 56 17.2	+27.00	15 48.99	67.93	3 16.60
SUN.	26	4 11 33.50	10.116	21 6 54.4	26.10	15 48.83	68.00	3 10.64
Mon.	27	4 15 36.52	10.135	21 17 9.9	25.19	15 48.68	68.07	3 4.20
Tues.	28	4 19 40.00	10.154	21 27 3.3	+24.26	15 48.53	68.13	2 57.30
Wed.	29	4 23 43.93	10.173	21 36 34.4	23.33	15 48.38	68.19	2 49.95
Thur.	30	4 27 48.30	10.191	21 45 43.0	22.39	15 48.23	68.25	2 42.15
Frid.	31	4 31 53.11	10.209	21 54 29.1	21.45	15 48.09	68.31	2 33.92
Sat.	32	4 35 58.34	10.226	N.22 2 52.4	+20.50	15 47.95	68.37	2 25.28

NOTE.—The mean time of semidiameter passing may be found by subtracting $0^{s}.19$ from the sidereal time.
The sign + prefixed to the hourly change of declination indicates that north declinations are incre

AT GREENWICH MEAN NOON.

Day of the Week.	Day of the Month.	THE SUN'S				Equation of Time, to be Added to Mean Time.	Diff. for 1 Hour.	Sidereal Time, or Right Ascension of Mean Sun.
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.			
		h m s	s	° ′ ″	″	m s	s	h m s
Wed.	1	2 33 13.55	9.538	N.15 3 7.1	+45.41	2 57.20	0.318	2 36 10.75
Thur.	2	2 37 2.73	9.561	15 21 9.6	44.78	3 4.57	0.296	2 40 7.31
Frid.	3	2 40 52.46	9.584	15 38 56.9	44.15	3 11.40	0.273	2 44 3.86
Sat.	4	2 44 42.75	9.607	15 56 28.8	+43.50	3 17.67	0.250	2 48 0.42
SUN.	5	2 48 33.60	9.631	16 13 44.9	42.84	3 23.37	0.226	2 51 56.97
Mon.	6	2 52 25.02	9.655	16 30 45.0	42.17	3 28.50	0.202	2 55 53.53
Tues.	7	2 56 17.03	9.679	16 47 28.7	+41.48	3 33.05	0.178	2 59 50.09
Wed.	8	3 0 9.62	9.703	17 3 55.8	40.78	3 37.02	0.153	3 3 46.64
Thur.	9	3 4 2.80	9.728	17 20 5.9	40.06	3 40.40	0.129	3 7 43.20
Frid.	10	3 7 56.56	9.752	17 35 58.8	+39.33	3 43.19	0.104	3 11 39.75
Sat.	11	3 11 50.91	9.777	17 51 34.2	38.60	3 45.39	0.079	3 15 36.31
SUN.	12	3 15 45.86	9.802	18 6 51.6	37.85	3 47.00	0.055	3 19 32.87
Mon.	13	3 19 41.41	9.826	18 21 50.9	+37.09	3 48.02	0.030	3 23 29.43
Tues.	14	3 23 37.54	9.851	18 36 31.8	36.31	3 48.45	0.006	3 27 25.98
Wed.	15	3 27 34.25	9.875	18 50 53.9	35.52	3 48.29	0.018	3 31 22.54
Thur.	16	3 31 31.54	9.899	19 4 56.9	+34.72	3 47.56	0.042	3 35 19.10
Frid.	17	3 35 29.40	9.922	19 18 40.5	33.91	3 46.26	0.066	3 39 15.65
Sat.	18	3 39 27.82	9.945	19 32 4.5	33.08	3 44.40	0.089	3 43 12.21
SUN.	19	3 43 26.78	9.968	19 45 8.5	+32.24	3 41.99	0.112	3 47 8.77
Mon.	20	3 47 26.28	9.990	19 57 52.2	31.39	3 39.05	0.134	3 51 5.33
Tues.	21	3 51 26.31	10.012	20 10 15.5	30.54	3 35.58	0.156	3 55 1.88
Wed.	22	3 55 26.86	10.033	20 22 18.0	+29.67	3 31.58	0.177	3 58 58.44
Thur.	23	3 59 27.92	10.054	20 33 59.6	28.79	3 27.08	0.198	4 2 55.00
Frid.	24	4 3 29.48	10.075	20 45 19.9	27.90	3 22.08	0.218	4 6 51.56
Sat.	25	4 7 31.52	10.095	20 56 18.7	+27.00	3 16.59	0.238	4 10 48.11
SUN.	26	4 11 34.04	10.115	21 6 55.8	26.09	3 10.63	0.258	4 14 44.67
Mon.	27	4 15 37.04	10.134	21 17 11.2	25.18	3 4.19	0.277	4 18 41.23
Tues.	28	4 19 40.50	10.153	21 27 4.5	+24.25	2 57.29	0.296	4 22 37.79
Wed.	29	4 23 44.41	10.172	21 36 35.5	23.32	2 49.94	0.315	4 26 34.34
Thur.	30	4 27 48.76	10.190	21 45 44.0	22.38	2 42.15	0.334	4 30 30.90
Frid.	31	4 31 53.54	10.208	21 54 30.0	21.44	2 33.92	0.352	4 34 27.46
Sat.	32	4 35 58.74	10.225	N.22 2 53.2	+20.49	2 25.28	0.369	4 38 24.02

Note.—The semidiameter for mean noon may be assumed the same as that for apparent noon. The sign + prefixed to the hourly change of declination indicates that north declinations are increasing.

Diff. for 1 Hour,
+$9^{s}.8565$.
(Table III.)

AT GREENWICH MEAN NOON.

Day of the Month.	Day of the Year.	THE SUN'S				Logarithm of the Radius Vector of the Earth.	Diff. for 1 Hour.	Mean Ti Sidereal
		True Longitude.		Diff. for 1 Hour.	Latitude.			
		λ	λ'					
		° ′ ″	′ ″	″	″			h m
1	122	40 44 11.2	44 1.6	145.43	−0.42	0.003 4457	+45.1	21 20
2	123	41 42 20.8	42 11.0	145.36	0.54	0.003 5536	44.9	21 16
3	124	42 40 28.7	40 18.8	145.30	0.65	0.003 6610	44.7	21 12
4	125	43 38 35.0	38 25.0	145.23	−0.73	0.003 7679	+44.4	21 8
5	126	44 36 39.8	36 29.6	145.17	0.79	0.003 8740	44.0	21 4
6	127	45 34 43.1	34 32.8	145.11	0.82	0.003 9793	43.7	21 0
7	128	46 32 45.0	32 34.6	145.05	−0.84	0.004 0837	+43.3	20 56
8	129	47 30 45.6	30 35.0	145.00	0.81	0.004 1871	42.8	20 52
9	130	48 28 44.8	28 34.0	144.94	0.77	0.004 2893	42.3	20 48
10	131	49 26 42.6	26 31.7	144.88	−0.69	0.004 3902	+41.7	20 44
11	132	50 24 39.2	24 28.1	144.82	0.60	0.004 4897	41.1	20 40
12	133	51 22 34.5	22 23.2	144.77	0.49	0.004 5877	40.4	20 37
13	134	52 20 28.5	20 17.1	144.72	−0.37	0.004 6840	+39.7	20 33
14	135	53 18 21.2	18 9.6	144.66	0.24	0.004 7785	38.9	20 29
15	136	54 16 12.6	16 0.9	144.61	−0.09	0.004 8710	38.1	20 25
16	137	55 14 2.6	13 50.8	144.56	+0.04	0.004 9615	+37.3	20 21
17	138	56 11 51.3	11 39.3	144.50	0.15	0.005 0499	36.4	20 17
18	139	57 9 38.5	9 26.3	144.44	0.23	0.005 1361	35.5	20 13
19	140	58 7 24.2	7 11.8	144.37	+0.28	0.005 2203	+34.6	20 9
20	141	59 5 8.4	4 55.8	144.31	0.30	0.005 3024	33.8	20 5
21	142	60 2 51.0	2 38.2	144.24	0.30	0.005 3825	33.0	20 1
22	143	61 0 32.0	0 19.0	144.18	+0.26	0.005 4607	+32.2	19 57
23	144	61 58 11.4	57 58.3	144.11	0.19	0.005 5372	31.5	19 53
24	145	62 55 49.3	55 36.0	144.04	+0.10	0.005 6121	30.9	19 49
25	146	63 53 25.6	53 12.2	143.98	−0.02	0.005 6854	+30.3	19 45
26	147	64 51 0.5	50 46.9	143.92	0.15	0.005 7573	29.7	19 42
27	148	65 48 34.0	48 20.2	143.87	0.29	0.005 8279	29.2	19 38
28	149	66 46 6.2	45 52.2	143.81	−0.41	0.005 8973	+28.7	19 34
29	150	67 43 37.1	43 22.9	143.76	0.53	0.005 9655	28.2	19 30
30	151	68 41 6.8	40 52.4	143.71	0.64	0.006 0325	27.7	19 26
31	152	69 38 35.4	38 20.9	143.67	0.73	0.006 0984	27.2	19 22
32	153	70 36 3.0	35 48.4	143.63	−0.79	0.006 1630	+26.7	19 18

NOTE.—The longitudes in the column λ are referred to the true equinox of their own date, while those in the column λ' are referred to the mean equinox of the beginning of the Besselian fictitious year.

Diff. for
$-9^{s}.8$
(Table

GREENWICH MEAN TIME.

Day of the Month.	THE MOON'S								
	SEMIDIAMETER.		HORIZONTAL PARALLAX.				UPPER TRANSIT.		AGE.
	Noon.	Midnight.	Noon.	Diff. for 1 Hour.	Midnight.	Diff. for 1 Hour.	Meridian of Greenwich.	Diff. for 1 Hour.	Noon.
	′ ″	′ ″	′ ″	″	′ ″	″	h m	m	d
1	15 27.3	15 22.7	56 37.3	−1.40	56 20.4	−1.40	12 22.1	2.03	14.0
2	15 18.1	15 13.6	56 3.6	1.39	55 47.0	1.36	13 11.9	2.12	15.0
3	15 9.2	15 5.1	55 31.0	1.30	55 15.8	1.22	14 3.6	2.18	16.0
4	15 1.3	14 57.8	55 1.8	−1.12	54 49.0	−1.00	14 56.3	2.20	17.0
5	14 54.7	14 52.2	54 37.8	0.85	54 28.5	0.69	15 49.0	2.17	18.0
6	14 50.2	14 48.8	54 21.2	0.52	54 16.0	−0.34	16 40.1	2.09	19.0
7	14 48.0	14 47.9	54 13.1	−0.14	54 12.7	+0.07	17 29.0	1.98	20.0
8	14 48.5	14 49.7	54 14.8	+0.28	54 19.5	0.50	18 15.3	1.88	21.0
9	14 51.7	14 54.4	54 26.8	0.71	54 36.6	0.92	18 59.4	1.80	22.0
10	14 57.8	15 1.8	54 48.9	+1.12	55 3.6	+1.32	19 41.8	1.75	23.0
11	15 6.4	15 11.6	55 20.6	1.50	55 39.5	1.65	20 23.6	1.75	24.0
12	15 17.2	15 23.2	56 0.2	1.79	56 22.4	1.89	21 6.0	1.80	25.0
13	15 29.5	15 36.0	56 45.6	+1.96	57 9.4	+2.00	21 50.2	1.90	26.0
14	15 42.6	15 49.1	57 33.5	2.00	57 57.3	1.95	22 37.5	2.06	27.0
15	15 55.4	16 1.3	58 20.3	1.86	58 42.0	1.73	23 29.3	2.27	28.0
16	16 6.7	16 11.5	59 1.9	+1.57	59 19.6	+1.37	6	. .	29.0
17	16 15.6	16 19.0	59 34.7	1.14	59 46.9	0.89	0 26.3	2.49	0.6
18	16 21.5	16 23.1	59 56.0	0.63	60 2.0	+0.36	1 28.3	2.66	1.6
19	16 23.8	16 23.7	60 4.8	+0.10	60 4.5	−0.15	2 33.1	2.72	2.6
20	16 22.9	16 21.3	60 1.3	−0.38	59 55.5	0.58	3 37.7	2.64	3.6
21	16 19.1	16 16.3	59 47.4	0.76	59 37.3	0.91	4 39.0	2.46	4.6
22	16 13.1	16 9.6	59 25.5	−1.04	59 12.4	−1.13	5 35.5	2.25	5.6
23	16 5.8	16 1.7	58 58.3	1.20	58 43.5	1.25	6 27.2	2.07	6.6
24	15 57.5	15 53.2	58 28.2	1.29	58 12.6	1.31	7 15.2	1.94	7.6
25	15 48.9	15 44.6	57 56.8	−1.32	57 40.9	−1.32	8 0.8	1.87	8.6
26	15 40.3	15 36.0	57 25.1	1.31	57 9.4	1.30	8 45.4	1.86	9.6
27	15 31.8	15 27.6	56 53.9	1.28	56 38.6	1.27	9 30.3	1.89	10.6
28	15 23.5	15 19.5	56 23.5	−1.25	56 8.6	−1.22	10 16.6	1.97	11.6
29	15 15.5	15 11.7	55 54.1	1.19	55 40.1	1.15	11 5.1	2.07	12.6
30	15 8.0	15 4.4	55 26.5	1.11	55 13.5	1.05	11 55.7	2.15	13.6
31	15 1.1	14 58.0	55 1.2	0.99	54 49.7	0.92	12 48.0	2.20	14.6
32	14 55.1	14 52.6	54 39.2	−0.82	54 29.9	−0.72	13 40.8	2.19	15.6

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	WEDNESDAY 1.					FRIDAY 3.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	14 34 12.68	2.0901	S.17 1 31.2	12.768	0	16 18 12.96	2.2401	S.25 11 39.5	7.315
1	14 36 18.17	2.0931	17 14 14.6	12.677	1	16 20 27.44	2.2427	25 18 54.4	7.182
2	14 38 23.85	2.0961	17 26 52.4	12.585	2	16 22 42.08	2.2452	25 26 1.3	7.048
3	14 40 29.71	2.0992	17 39 24.7	12.491	3	16 24 56.86	2.2476	25 33 0.1	6.913
4	14 42 35.76	2.1024	17 51 51.4	12.397	4	16 27 11.79	2.2500	25 39 50.9	6.778
5	14 44 42.00	2.1056	18 4 12.3	12.302	5	16 29 26.87	2.2524	25 46 33.5	6.643
6	14 46 48.42	2.1087	18 16 27.5	12.205	6	16 31 42.09	2.2547	25 53 8.0	6.508
7	14 48 55.04	2.1118	18 28 36.9	12.107	7	16 33 57.44	2.2569	25 59 34.4	6.371
8	14 51 1.85	2.1150	18 40 40.4	12.009	8	16 36 12.93	2.2591	26 5 52.5	6.233
9	14 53 8.85	2.1183	18 52 37.9	11.910	9	16 38 28.55	2.2613	26 12 2.4	6.096
10	14 55 16.04	2.1216	19 4 29.4	11.809	10	16 40 44.29	2.2634	26 18 4.0	5.959
11	14 57 23.43	2.1248	19 16 14.9	11.707	11	16 43 0.15	2.2654	26 23 57.4	5.820
12	14 59 31.02	2.1280	19 27 54.2	11.604	12	16 45 16.13	2.2673	26 29 42.4	5.681
13	15 1 38.80	2.1313	19 39 27.3	11.500	13	16 47 32.22	2.2691	26 35 19.1	5.542
14	15 3 46.78	2.1346	19 50 54.2	11.396	14	16 49 48.43	2.2709	26 40 47.4	5.402
15	15 5 54.95	2.1379	20 2 14.8	11.291	15	16 52 4.74	2.2727	26 46 7.3	5.262
16	15 8 3.32	2.1412	20 13 29.1	11.184	16	16 54 21.15	2.2744	26 51 18.7	5.121
17	15 10 11.89	2.1445	20 24 36.9	11.076	17	16 56 37.66	2.2760	26 56 21.7	4.980
18	15 12 20.66	2.1478	20 35 38.2	10.967	18	16 58 54.26	2.2775	27 1 16.3	4.839
19	15 14 29.63	2.1511	20 46 33.0	10.858	19	17 1 10.95	2.2789	27 6 2.4	4.698
20	15 16 38.79	2.1544	20 57 21.1	10.748	20	17 3 27.73	2.2803	27 10 40.1	4.557
21	15 18 48.16	2.1577	21 8 2.6	10.636	21	17 5 44.59	2.2816	27 15 9.2	4.414
22	15 20 57.72	2.1610	21 18 37.4	10.524	22	17 8 1.52	2.2828	27 19 29.8	4.271
23	15 23 7.48	2.1643	S.21 29 5.5	10.411	23	17 10 18.52	2.2839	S.27 23 41.8	4.129
	THURSDAY 2.					SATURDAY 4.			
0	15 25 17.44	2.1676	S.21 39 26.7	10.297	0	17 12 35.59	2.2850	S.27 27 45.2	3.986
1	15 27 27.59	2.1708	21 49 41.1	10.182	1	17 14 52.72	2.2860	27 31 40.0	3.843
2	15 29 37.94	2.1741	21 59 48.5	10.066	2	17 17 9.90	2.2868	27 35 26.3	3.700
3	15 31 48.49	2.1774	22 9 48.9	9.949	3	17 19 27.14	2.2877	27 39 4.0	3.556
4	15 33 59.23	2.1806	22 19 42.3	9.831	4	17 21 44.43	2.2885	27 42 33.1	3.412
5	15 36 10.16	2.1838	22 29 28.7	9.713	5	17 24 1.76	2.2891	27 45 53.5	3.268
6	15 38 21.29	2.1870	22 39 7.9	9.594	6	17 26 19.12	2.2897	27 49 5.3	3.124
7	15 40 32.61	2.1902	22 48 39.9	9.474	7	17 28 36.51	2.2902	27 52 8.4	2.980
8	15 42 44.13	2.1934	22 58 4.7	9.353	8	17 30 53.93	2.2906	27 55 2.9	2.836
9	15 44 55.83	2.1966	23 7 22.2	9.231	9	17 33 11.38	2.2909	27 57 48.7	2.692
10	15 47 7.72	2.1997	23 16 32.3	9.108	10	17 35 28.84	2.2911	28 0 25.9	2.548
11	15 49 19.80	2.2028	23 25 35.1	8.984	11	17 37 46.31	2.2913	28 2 54.4	2.403
12	15 51 32.06	2.2059	23 34 30.5	8.860	12	17 40 3.79	2.2914	28 5 14.3	2.258
13	15 53 44.51	2.2089	23 43 18.4	8.736	13	17 42 21.27	2.2913	28 7 25.5	2.114
14	15 55 57.14	2.2119	23 51 58.8	8.610	14	17 44 38.75	2.2912	28 9 28.0	1.970
15	15 58 9.95	2.2149	24 0 31.6	8.483	15	17 46 56.22	2.2911	28 11 21.8	1.826
16	16 0 22.93	2.2179	24 8 56.8	8.356	16	17 49 13.67	2.2908	28 13 7.0	1.681
17	16 2 36.09	2.2208	24 17 14.3	8.228	17	17 51 31.10	2.2904	28 14 43.6	1.536
18	16 4 49.43	2.2237	24 25 24.2	8.100	18	17 53 48.51	2.2899	28 16 11.5	1.392
19	16 7 2.94	2.2266	24 33 26.3	7.971	19	17 56 5.89	2.2893	28 17 30.7	1.248
20	16 9 16.62	2.2294	24 41 20.7	7.841	20	17 58 23.24	2.2887	28 18 41.3	1.104
21	16 11 30.46	2.2321	24 49 7.2	7.710	21	18 0 40.54	2.2880	28 19 43.2	0.960
22	16 13 44.46	2.2348	24 56 45.9	7.579	22	18 2 57.80	2.2872	28 20 36.5	0.816
23	16 15 58.63	2.2375	25 4 16.6	7.447	23	18 5 15.01	2.2863	28 21 21.2	0.673
24	16 18 12.96	2.2401	S.25 11 39.5	7.315	24	18 7 32.16	2.2853	S.28 21 57.3	0.530

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	SUNDAY 5.					TUESDAY 7.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	18 7 32.16	2.2853	S.28 21 57.3	0.530	0	19 54 40.76	2.1552	S.26 8 53.9	5.879
1	18 9 49.25	2.2843	28 22 24.8	0.386	1	19 56 49.95	2.1512	26 2 57.6	5.998
2	18 12 6.28	2.2832	28 22 43.7	0.243	2	19 58 58.90	2.1472	25 56 54.1	6.117
3	18 14 23.23	2.2820	28 22 54.0	−0.101	3	20 1 7.62	2.1432	25 50 43.6	6.234
4	18 16 40.11	2.2807	28 22 55.7	+0.042	4	20 3 16.10	2.1392	25 44 26.0	6.351
5	18 18 56.91	2.2793	28 22 48.9	0.185	5	20 5 24.34	2.1352	25 38 1.4	6.468
6	18 21 13.62	2.2778	28 22 33.6	0.327	6	20 7 32.33	2.1312	25 31 29.9	6.583
7	18 23 30.24	2.2762	28 22 9.8	0.469	7	20 9 40.08	2.1272	25 24 51.5	6.698
8	18 25 46.77	2.2746	28 21 37.5	0.610	8	20 11 47.59	2.1231	25 18 6.2	6.812
9	18 28 3.20	2.2729	28 20 56.7	0.751	9	20 13 54.85	2.1190	25 11 14.1	6.925
10	18 30 19.52	2.2711	28 20 7.4	0.892	10	20 16 1.86	2.1149	25 4 15.2	7.038
11	18 32 35.73	2.2692	28 19 9.6	1.032	11	20 18 8.63	2.1107	24 57 9.5	7.150
12	18 34 51.83	2.2673	28 18 3.4	1.172	12	20 20 15.15	2.1066	24 49 57.2	7.261
13	18 37 7.81	2.2653	28 16 48.9	1.312	13	20 22 21.42	2.1025	24 42 38.2	7.371
14	18 39 23.66	2.2631	28 15 26.0	1.452	14	20 24 27.45	2.0984	24 35 12.6	7.481
15	18 41 39.38	2.2609	28 13 54.8	1.591	15	20 26 33.23	2.0943	24 27 40.5	7.590
16	18 43 54.97	2.2587	28 12 15.2	1.729	16	20 28 38.76	2.0901	24 20 1.8	7.698
17	18 46 10.43	2.2564	28 10 27.3	1.867	17	20 30 44.04	2.0860	24 12 16.7	7.805
18	18 48 25.75	2.2540	28 8 31.1	2.005	18	20 32 49.07	2.0819	24 4 25.2	7.912
19	18 50 40.92	2.2515	28 6 26.7	2.142	19	20 34 53.86	2.0777	23 56 27.3	8.018
20	18 52 55.93	2.2489	28 4 14.0	2.279	20	20 36 58.40	2.0736	23 48 23.1	8.123
21	18 55 10.79	2.2463	28 1 53.1	2.416	21	20 39 2.69	2.0695	23 40 12.6	8.228
22	18 57 25.50	2.2437	27 59 24.1	2.551	22	20 41 6.74	2.0653	23 31 55.8	8.331
23	18 59 40.04	2.2410	S.27 56 47.0	2.686	23	20 43 10.54	2.0611	S.23 23 32.9	8.433
	MONDAY 6.					WEDNESDAY 8.			
0	19 1 54.41	2.2382	S.27 54 1.8	2.821	0	20 45 14.09	2.0571	S.23 15 3.8	8.535
1	19 4 8.61	2.2353	27 51 8.5	2.955	1	20 47 17.40	2.0531	23 6 28.6	8.637
2	19 6 22.64	2.2323	27 48 7.1	3.089	2	20 49 20.46	2.0490	22 57 47.3	8.738
3	19 8 36.49	2.2293	27 44 57.7	3.223	3	20 51 23.28	2.0450	22 49 0.0	8.838
4	19 10 50.16	2.2263	27 41 40.4	3.356	4	20 53 25.85	2.0409	22 40 6.8	8.937
5	19 13 3.65	2.2232	27 38 15.1	3.488	5	20 55 28.18	2.0368	22 31 7.7	9.035
6	19 15 16.95	2.2200	27 34 41.9	3.619	6	20 57 30.27	2.0328	22 22 2.7	9.133
7	19 17 30.05	2.2168	27 31 0.8	3.750	7	20 59 32.12	2.0288	22 12 51.8	9.230
8	19 19 42.96	2.2135	27 27 11.9	3.881	8	21 1 33.73	2.0249	22 3 35.2	9.326
9	19 21 55.68	2.2102	27 23 15.2	4.010	9	21 3 35.11	2.0210	21 54 12.8	9.421
10	19 24 8.19	2.2069	27 19 10.7	4.139	10	21 5 36.25	2.0170	21 44 44.7	9.515
11	19 26 20.50	2.2035	27 14 58.5	4.268	11	21 7 37.15	2.0131	21 35 11.0	9.609
12	19 28 32.60	2.2000	27 10 38.6	4.396	12	21 9 37.82	2.0092	21 25 31.7	9.702
13	19 30 44.49	2.1964	27 6 11.0	4.523	13	21 11 38.26	2.0053	21 15 46.8	9.794
14	19 32 56.17	2.1928	27 1 35.8	4.649	14	21 13 38.47	2.0015	21 5 56.4	9.886
15	19 35 7.63	2.1892	26 56 53.1	4.775	15	21 15 38.45	1.9977	20 56 0.5	9.977
16	19 37 18.88	2.1856	26 52 2.8	4.901	16	21 17 38.20	1.9940	20 45 59.1	10.067
17	19 39 29.91	2.1819	26 47 5.0	5.026	17	21 19 37.72	1.9903	20 35 52.4	10.156
18	19 41 40.71	2.1782	26 41 59.8	5.150	18	21 21 37.02	1.9866	20 25 40.4	10.245
19	19 43 51.29	2.1745	26 36 47.1	5.273	19	21 23 36.10	1.9829	20 15 23.0	10.333
20	19 46 1.65	2.1707	26 31 27.0	5.395	20	21 25 34.97	1.9792	20 5 0.4	10.420
21	19 48 11.78	2.1669	26 25 59.6	5.517	21	21 27 33.62	1.9756	19 54 32.6	10.507
22	19 50 21.67	2.1630	26 20 24.9	5.638	22	21 29 32.05	1.9721	19 43 59.7	10.592
23	19 52 31.33	2.1591	26 14 43.0	5.759	23	21 31 30.27	1.9686	19 33 21.6	10.676
24	19 54 40.76	2.1552	S.26 8 53.9	5.879	24	21 33 28.28	1.9651	S.19 22 38.5	10.760

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	THURSDAY 9.					SATURDAY 11.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	21 33 28.28	1.9651	S.19 22 38.5	10.760	0	23 4 43.16	1.8592	S. 9 22 42.0	13.965
1	21 35 26.08	1.9617	19 11 50.3	10.844	1	23 6 34.69	1.8585	9 8 42.6	14.014
2	21 37 23.68	1.9583	19 0 57.1	10.927	2	23 8 26.18	1.8579	8 54 40.3	14.063
3	21 39 21.07	1.9549	18 49 59.0	11.009	3	23 10 17.64	1.8574	8 40 35.1	14.111
4	21 41 18.26	1.9516	18 38 56.0	11.090	4	23 12 9.07	1.8570	8 26 27.0	14.158
5	21 43 15.25	1.9483	18 27 48.1	11.171	5	23 14 0.47	1.8566	8 12 16.1	14.205
6	21 45 12.05	1.9450	18 16 35.4	11.251	6	23 15 51.85	1.8563	7 58 2.5	14.250
7	21 47 8.66	1.9419	18 5 18.0	11.330	7	23 17 43.22	1.8561	7 43 46.1	14.295
8	21 49 5.08	1.9388	17 53 55.9	11.409	8	23 19 34.58	1.8559	7 29 27.1	14.340
9	21 51 1.31	1.9357	17 42 29.1	11.486	9	23 21 25.93	1.8558	7 15 5.4	14.383
10	21 52 57.35	1.9326	17 30 57.6	11.563	10	23 23 17.28	1.8558	7 0 41.2	14.425
11	21 54 53.21	1.9296	17 19 21.5	11.640	11	23 25 8.63	1.8558	6 46 14.4	14.467
12	21 56 48.90	1.9267	17 7 40.9	11.715	12	23 26 59.98	1.8560	6 31 45.1	14.508
13	21 58 44.42	1.9238	16 55 55.8	11.789	13	23 28 51.35	1.8563	6 17 13.4	14.548
14	22 0 39.76	1.9209	16 44 6.2	11.863	14	23 30 42.73	1.8566	6 2 39.2	14.588
15	22 2 34.93	1.9181	16 32 12.1	11.937	15	23 32 34.13	1.8569	5 48 2.7	14.627
16	22 4 29.93	1.9154	16 20 13.6	12.010	16	23 34 25.55	1.8573	5 33 23.9	14.665
17	22 6 24.77	1.9127	16 8 10.8	12.082	17	23 36 17.01	1.8579	5 18 42.9	14.703
18	22 8 19.45	1.9101	15 56 3.8	12.153	18	23 38 8.50	1.8585	5 3 59.6	14.740
19	22 10 13.98	1.9075	15 43 52.5	12.224	19	23 40 0.03	1.8592	4 49 14.2	14.775
20	22 12 8.36	1.9050	15 31 37.0	12.294	20	23 41 51.60	1.8600	4 34 26.6	14.809
21	22 14 2.58	1.9025	15 19 17.3	12.363	21	23 43 43.22	1.8608	4 19 37.0	14.843
22	22 15 56.66	1.9000	15 6 53.4	12.432	22	23 45 34.89	1.8617	4 4 45.4	14.877
23	22 17 50.59	1.8977	S.14 54 25.5	12.500	23	23 47 26.62	1.8627	S. 3 49 51.8	14.909
	FRIDAY 10.					SUNDAY 12.			
0	22 19 44.38	1.8954	S.14 41 53.5	12.567	0	23 49 18.41	1.8637	S. 3 34 56.3	14.940
1	22 21 38.04	1.8931	14 29 17.5	12.633	1	23 51 10.27	1.8648	3 19 59.0	14.971
2	22 23 31.56	1.8909	14 16 37.6	12.698	2	23 53 2.20	1.8661	3 4 59.8	15.001
3	22 25 24.96	1.8888	14 3 53.8	12.763	3	23 54 54.20	1.8675	2 49 58.9	15.030
4	22 27 18.23	1.8868	13 51 6.1	12.828	4	23 56 46.29	1.8689	2 34 56.2	15.058
5	22 29 11.38	1.8848	13 38 14.5	12.891	5	23 58 38.46	1.8703	2 19 51.9	15.085
6	22 31 4.41	1.8829	13 25 19.1	12.954	6	0 0 30.73	1.8718	2 4 46.0	15.111
7	22 32 57.32	1.8810	13 12 20.0	13.017	7	0 2 23.09	1.8735	1 49 38.5	15.137
8	22 34 50.13	1.8791	12 59 17.2	13.078	8	0 4 15.55	1.8753	1 34 29.5	15.162
9	22 36 42.83	1.8774	12 46 10.7	13.138	9	0 6 8.12	1.8771	1 19 19.1	15.186
10	22 38 35.42	1.8758	12 33 0.5	13.198	10	0 8 0.80	1.8789	1 4 7.3	15.209
11	22 40 27.92	1.8742	12 19 46.8	13.258	11	0 9 53.59	1.8809	0 48 54.1	15.231
12	22 42 20.32	1.8726	12 6 29.6	13.317	12	0 11 46.51	1.8830	0 33 39.6	15.251
13	22 44 12.63	1.8711	11 53 8.9	13.374	13	0 13 39.55	1.8851	0 18 23.9	15.270
14	22 46 4.85	1.8697	11 39 44.7	13.431	14	0 15 32.73	1.8873	S. 0 3 7.1	15.289
15	22 47 56.99	1.8683	11 26 17.1	13.488	15	0 17 26.04	1.8896	N. 0 12 10.8	15.307
16	22 49 49.05	1.8670	11 12 46.1	13.544	16	0 19 19.49	1.8920	0 27 29.8	15.325
17	22 51 41.03	1.8658	10 59 11.8	13.599	17	0 21 13.08	1.8945	0 42 49.8	15.341
18	22 53 32.94	1.8647	10 45 34.2	13.653	18	0 23 6.83	1.8971	0 58 10.7	15.356
19	22 55 24.79	1.8636	10 31 53.3	13.707	19	0 25 0.74	1.8998	1 13 32.5	15.371
20	22 57 16.57	1.8625	10 18 9.3	13.760	20	0 26 54.81	1.9025	1 28 55.1	15.384
21	22 59 8.30	1.8616	10 4 22.1	13.812	21	0 28 49.04	1.9053	1 44 18.5	15.396
22	23 0 59.97	1.8608	9 50 31.8	13.864	22	0 30 43.44	1.9083	1 59 42.6	15.407
23	23 2 51.59	1.8600	9 36 38.4	13.915	23	0 32 38.02	1.9113	2 15 7.3	15.417
24	23 4 43.16	1.8592	S. 9 22 42.0	13.965	24	0 34 32.79	1.9143	N. 2 30 32.6	15.426

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	MONDAY 13.					WEDNESDAY 15.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	0 34 32.79	1.9143	N. 2 30 32.6	15.426	0	2 11 37.41	2.1630	N. 14 37 59.3	14.345
1	0 36 27.74	1.9174	2 45 58.4	15.433	1	2 13 47.41	2.1702	14 52 18.2	14.285
2	0 38 22.88	1.9207	3 1 24.6	15.440	2	2 15 57.84	2.1774	15 6 33.5	14.223
3	0 40 18.22	1.9241	3 16 51.1	15.446	3	2 18 8.70	2.1847	15 20 45.0	14.160
4	0 42 13.77	1.9275	3 32 18.0	15.450	4	2 20 20.00	2.1921	15 34 52.7	14.095
5	0 44 9.52	1.9310	3 47 45.1	15.454	5	2 22 31.75	2.1995	15 48 56.4	14.028
6	0 46 5.49	1.9346	4 3 12.4	15.456	6	2 24 43.95	2.2070	16 2 56.0	13.959
7	0 48 1.67	1.9383	4 18 39.9	15.457	7	2 26 56.60	2.2146	16 16 51.3	13.888
8	0 49 58.08	1.9421	4 34 7.3	15.458	8	2 29 9.70	2.2222	16 30 42.4	13.815
9	0 51 54.71	1.9459	4 49 34.7	15.457	9	2 31 23.26	2.2299	16 44 29.1	13.740
10	0 53 51.58	1.9498	5 5 2.1	15.454	10	2 33 37.28	2.2376	16 58 11.2	13.663
11	0 55 48.69	1.9538	5 20 29.3	15.450	11	2 35 51.77	2.2453	17 11 48.7	13.585
12	0 57 46.05	1.9579	5 35 56.2	15.445	12	2 38 6.73	2.2532	17 25 21.4	13.505
13	0 59 43.65	1.9622	5 51 22.7	15.439	13	2 40 22.16	2.2611	17 38 49.2	13.422
14	1 1 41.51	1.9665	6 6 48.8	15.432	14	2 42 38.06	2.2690	17 52 12.0	13.337
15	1 3 39.63	1.9708	6 22 14.5	15.424	15	2 44 54.44	2.2770	18 5 29.7	13.251
16	1 5 38.02	1.9753	6 37 39.6	15.415	16	2 47 11.30	2.2850	18 18 42.2	13.163
17	1 7 36.68	1.9799	6 53 4.1	15.404	17	2 49 28.64	2.2930	18 31 49.3	13.073
18	1 9 35.61	1.9845	7 8 28.0	15.391	18	2 51 46.47	2.3011	18 44 51.0	12.981
19	1 11 34.82	1.9892	7 23 51.1	15.377	19	2 54 4.78	2.3093	18 57 47.0	12.886
20	1 13 34.32	1.9941	7 39 13.3	15.362	20	2 56 23.58	2.3175	19 10 37.3	12.790
21	1 15 34.11	1.9990	7 54 34.6	15.346	21	2 58 42.87	2.3257	19 23 21.8	12.692
22	1 17 34.20	2.0040	8 9 54.9	15.329	22	3 1 2.66	2.3339	19 36 0.3	12.591
23	1 19 34.59	2.0091	N. 8 25 14.1	15.310	23	3 3 22.94	2.3421	N. 19 48 32.8	12.489
	TUESDAY 14.					THURSDAY 16.			
0	1 21 35.29	2.0142	N. 8 40 32.1	15.289	0	3 5 43.72	2.3504	N. 20 0 59.0	12.385
1	1 23 36.30	2.0195	8 55 48.8	15.267	1	3 8 5.00	2.3587	20 13 18.9	12.279
2	1 25 37.63	2.0249	9 11 4.2	15.244	2	3 10 26.77	2.3670	20 25 32.4	12.171
3	1 27 39.29	2.0303	9 26 18.2	15.220	3	3 12 49.04	2.3753	20 37 39.4	12.060
4	1 29 41.27	2.0358	9 41 30.6	15.194	4	3 15 11.81	2.3836	20 49 39.6	11.947
5	1 31 43.58	2.0414	9 56 41.4	15.166	5	3 17 35.09	2.3920	21 1 33.0	11.832
6	1 33 46.23	2.0471	10 11 50.5	15.137	6	3 19 58.87	2.4004	21 13 19.5	11.715
7	1 35 49.23	2.0529	10 26 57.9	15.107	7	3 22 23.15	2.4088	21 24 58.9	11.596
8	1 37 52.58	2.0587	10 42 3.4	15.075	8	3 24 47.93	2.4172	21 36 31.1	11.476
9	1 39 56.28	2.0646	10 57 6.9	15.041	9	3 27 13.22	2.4256	21 47 56.0	11.354
10	1 42 0.33	2.0706	11 12 8.3	15.006	10	3 29 39.00	2.4340	21 59 13.5	11.228
11	1 44 4.75	2.0767	11 27 7.6	14.970	11	3 32 5.29	2.4423	22 10 23.4	11.100
12	1 46 9.54	2.0829	11 42 4.7	14.932	12	3 34 32.08	2.4506	22 21 25.6	10.972
13	1 48 14.70	2.0891	11 56 59.5	14.892	13	3 36 59.37	2.4589	22 32 20.0	10.842
14	1 50 20.24	2.0954	12 11 51.8	14.851	14	3 39 27.15	2.4672	22 43 6.5	10.709
15	1 52 26.16	2.1018	12 26 41.6	14.808	15	3 41 55.43	2.4755	22 53 45.0	10.573
16	1 54 32.47	2.1083	12 41 28.7	14.763	16	3 44 24.21	2.4837	23 4 15.3	10.435
17	1 56 39.17	2.1149	12 56 13.1	14.717	17	3 46 53.48	2.4919	23 14 37.3	10.296
18	1 58 46.26	2.1216	13 10 54.7	14.669	18	3 49 23.24	2.5001	23 24 50.8	10.155
19	2 0 53.75	2.1284	13 25 33.4	14.619	19	3 51 53.49	2.5082	23 34 55.8	10.012
20	2 3 1.65	2.1352	13 40 9.1	14.568	20	3 54 24.22	2.5162	23 44 52.2	9.866
21	2 5 9.97	2.1420	13 54 41.6	14.515	21	3 56 55.44	2.5242	23 54 39.8	9.718
22	2 7 18.70	2.1489	14 9 10.9	14.460	22	3 59 27.14	2.5322	24 4 18.5	9.569
23	2 9 27.84	2.1559	14 23 36.8	14.403	23	4 1 59.31	2.5402	24 13 48.1	9.418
24	2 11 37.41	2.1630	N. 14 37 59.3	14.345	24	4 4 31.96	2.5481	N. 24 23 8.6	9.265

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	FRIDAY 17.					SUNDAY 19.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	4 4 31.96	2.5481	N.24 23 8.6	9.265	0	6 13 38.33	2.7683	N.28 20 2.8	+0.149
1	4 7 5.07	2.5558	24 32 19.8	9.110	1	6 16 24.43	2.7683	28 20 5.5	−0.061
2	4 9 38.65	2.5635	24 41 21.7	8.952	2	6 19 10.52	2.7681	28 19 55.6	0.271
3	4 12 12.69	2.5712	24 50 14.1	8.792	3	6 21 56.60	2.7677	28 19 33.1	0.481
4	4 14 47.19	2.5787	24 58 56.9	8.631	4	6 24 42.64	2.7668	28 18 58.0	0.690
5	4 17 22.13	2.5861	25 7 29.9	8.469	5	6 27 28.63	2.7659	28 18 10.3	0.899
6	4 19 57.52	2.5935	25 15 53.1	8.305	6	6 30 14.57	2.7650	28 17 10.0	1.108
7	4 22 33.35	2.6008	25 24 6.4	8.138	7	6 33 0.44	2.7637	28 15 57.2	1.317
8	4 25 9.61	2.6079	25 32 9.7	7.969	8	6 35 46.22	2.7622	28 14 32.0	1.526
9	4 27 46.30	2.6150	25 40 2.8	7.799	9	6 38 31.90	2.7605	28 12 54.3	1.734
10	4 30 23.41	2.6220	25 47 45.6	7.627	10	6 41 17.47	2.7586	28 11 4.1	1.941
11	4 33 0.94	2.6288	25 55 18.0	7.453	11	6 44 2.92	2.7565	28 9 1.4	2.148
12	4 35 38.87	2.6356	26 2 40.0	7.278	12	6 46 48.24	2.7542	28 6 46.3	2.355
13	4 38 17.20	2.6422	26 9 51.4	7.101	13	6 49 33.41	2.7516	28 4 18.9	2.560
14	4 40 55.93	2.6487	26 16 52.1	6.922	14	6 52 18.43	2.7488	28 1 39.1	2.765
15	4 43 35.05	2.6551	26 23 42.0	6.742	15	6 55 3.28	2.7459	27 58 47.0	2.970
16	4 46 14.54	2.6613	26 30 21.1	6.560	16	6 57 47.94	2.7428	27 55 42.7	3.174
17	4 48 54.40	2.6674	26 36 49.2	6.376	17	7 0 32.41	2.7395	27 52 26.2	3.377
18	4 51 34.62	2.6733	26 43 6.3	6.191	18	7 3 16.67	2.7360	27 48 57.5	3.579
19	4 54 15.19	2.6791	26 49 12.3	6.005	19	7 6 0.72	2.7323	27 45 16.8	3.780
20	4 56 56.11	2.6848	26 55 7.0	5.818	20	7 8 44.54	2.7284	27 41 24.0	3.980
21	4 59 37.36	2.6903	27 0 50.3	5.629	21	7 11 28.12	2.7243	27 37 19.2	4.179
22	5 2 18.93	2.6956	27 6 22.3	5.438	22	7 14 11.46	2.7201	27 33 2.5	4.377
23	5 5 0.82	2.7007	N.27 11 42.8	5.246	23	7 16 54.54	2.7157	N.27 28 33.9	4.574
	SATURDAY 18.					MONDAY 20.			
0	5 7 43.02	2.7057	N.27 16 51.8	5.053	0	7 19 37.34	2.7111	N.27 23 53.6	4.770
1	5 10 25.51	2.7106	27 21 49.1	4.858	1	7 22 19.87	2.7064	27 19 1.5	4.965
2	5 13 8.29	2.7153	27 26 34.7	4.662	2	7 25 2.10	2.7015	27 13 57.8	5.159
3	5 15 51.34	2.7198	27 31 8.5	4.465	3	7 27 44.04	2.6964	27 8 42.5	5.351
4	5 18 34.65	2.7241	27 35 30.5	4.267	4	7 30 25.66	2.6912	27 3 15.7	5.542
5	5 21 18.22	2.7282	27 39 40.6	4.068	5	7 33 6.97	2.6858	26 57 37.4	5.732
6	5 24 2.03	2.7321	27 43 38.7	3.868	6	7 35 47.96	2.6803	26 51 47.8	5.920
7	5 26 46.07	2.7358	27 47 24.7	3.667	7	7 38 28.61	2.6747	26 45 47.0	6.107
8	5 29 30.33	2.7393	27 50 58.7	3.465	8	7 41 8.91	2.6689	26 39 35.0	6.293
9	5 32 14.79	2.7427	27 54 20.5	3.262	9	7 43 48.87	2.6630	26 33 11.8	6.477
10	5 34 59.45	2.7459	27 57 30.1	3.058	10	7 46 28.46	2.6569	26 26 37.7	6.659
11	5 37 44.29	2.7488	28 0 27.5	2.854	11	7 49 7.69	2.6507	26 19 52.7	6.841
12	5 40 29.31	2.7516	28 3 12.6	2.649	12	7 51 46.55	2.6444	26 12 56.8	7.021
13	5 43 14.49	2.7542	28 5 45.3	2.443	13	7 54 25.02	2.6380	26 5 50.2	7.198
14	5 45 59.81	2.7565	28 8 5.7	2.236	14	7 57 3.11	2.6315	25 58 33.0	7.374
15	5 48 45.27	2.7586	28 10 13.7	2.029	15	7 59 40.80	2.6249	25 51 5.3	7.549
16	5 51 30.85	2.7605	28 12 9.2	1.822	16	8 2 18.09	2.6182	25 43 27.1	7.722
17	5 54 16.53	2.7622	28 13 52.3	1.614	17	8 4 54.98	2.6113	25 35 38.6	7.894
18	5 57 2.32	2.7637	28 15 22.9	1.405	18	8 7 31.45	2.6043	25 27 39.8	8.064
19	5 59 48.19	2.7650	28 16 41.0	1.196	19	8 10 7.50	2.5973	25 19 30.9	8.232
20	6 2 34.13	2.7661	28 17 46.5	0.987	20	8 12 43.13	2.5902	25 11 12.0	8.398
21	6 5 20.13	2.7670	28 18 39.4	0.778	21	8 15 18.33	2.5830	25 2 43.2	8.562
22	6 8 6.17	2.7676	28 19 19.8	0.569	22	8 17 53.10	2.5758	24 54 4.5	8.725
23	6 10 52.24	2.7680	28 19 47.6	0.359	23	8 20 27.43	2.5685	24 45 16.1	8.886
24	6 13 38.33	2.7683	N.28 20 2.8	0.149	24	8 23 1.32	2.5611	N.24 36 18.1	9.045

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	TUESDAY 21.					THURSDAY 23.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	8 23 1.32	2.5611	N.24 36 18.1	9.045	0	10 17 7.77	2.2022	N.14 54 37.6	14.468
1	8 25 34.76	2.5537	24 27 10.6	9.203	1	10 19 19.71	2.1958	14 40 7.5	14.536
2	8 28 7.76	2.5462	24 17 53.7	9.359	2	10 21 31.26	2.1894	14 25 33.3	14.603
3	8 30 40.31	2.5386	24 8 27.6	9.512	3	10 23 42.44	2.1832	14 10 55.1	14.668
4	8 33 12.40	2.5310	23 58 52.3	9.664	4	10 25 53.24	2.1771	13 56 13.1	14.731
5	8 35 44.03	2.5234	23 49 7.9	9.814	5	10 28 3.68	2.1709	13 41 27.4	14.792
6	8 38 15.20	2.5157	23 39 14.6	9.962	6	10 30 13.75	2.1648	13 26 38.1	14.852
7	8 40 45.91	2.5080	23 29 12.4	10.108	7	10 32 23.46	2.1589	13 11 45.2	14.911
8	8 43 16.15	2.5003	23 19 1.5	10.252	8	10 34 32.82	2.1531	12 56 48.8	14.968
9	8 45 45.93	2.4925	23 8 42.1	10.395	9	10 36 41.83	2.1473	12 41 49.1	15.023
10	8 48 15.24	2.4847	22 58 14.2	10.536	10	10 38 50.50	2.1416	12 26 46.1	15.076
11	8 50 44.09	2.4768	22 47 37.9	10.674	11	10 40 58.83	2.1361	12 11 40.0	15.128
12	8 53 12.46	2.4689	22 36 53.3	10.810	12	10 43 6.83	2.1306	11 56 30.8	15.178
13	8 55 40.36	2.4611	22 26 0.6	10.945	13	10 45 14.50	2.1251	11 41 18.6	15.226
14	8 58 7.79	2.4533	22 14 59.9	11.078	14	10 47 21.84	2.1198	11 26 3.6	15.273
15	9 0 34.75	2.4454	22 3 51.3	11.209	15	10 49 28.87	2.1146	11 10 45.8	15.319
16	9 3 1.24	2.4375	21 52 34.9	11.338	16	10 51 35.59	2.1094	10 55 25.3	15.364
17	9 5 27.25	2.4297	21 41 10.8	11.465	17	10 53 42.00	2.1043	10 40 2.2	15.406
18	9 7 52.79	2.4218	21 29 39.1	11.590	18	10 55 48.10	2.0993	10 24 36.6	15.447
19	9 10 17.86	2.4139	21 18 0.0	11.713	19	10 57 53.91	2.0944	10 9 8.6	15.487
20	9 12 42.46	2.4061	21 6 13.6	11.834	20	10 59 59.43	2.0896	9 53 38.2	15.525
21	9 15 6.59	2.3983	20 54 20.0	11.953	21	11 2 4.66	2.0849	9 38 5.6	15.562
22	9 17 30.25	2.3904	20 42 19.2	12.071	22	11 4 9.61	2.0803	9 22 30.8	15.597
23	9 19 53.44	2.3826	N.20 30 11.4	12.187	23	11 6 14.28	2.0757	N. 9 6 54.0	15.631
	WEDNESDAY 22.					FRIDAY 24.			
0	9 22 16.16	2.3749	N.20 17 56.8	12.300	0	11 8 18.69	2.0712	N. 8 51 15.2	15.663
1	9 24 38.41	2.3671	20 5 35.5	12.411	1	11 10 22.83	2.0668	8 35 34.5	15.693
2	9 27 0.21	2.3594	19 53 7.5	12.521	2	11 12 26.71	2.0625	8 19 52.0	15.723
3	9 29 21.54	2.3517	19 40 33.0	12.629	3	11 14 30.34	2.0584	8 4 7.8	15.751
4	9 31 42.41	2.3440	19 27 52.0	12.734	4	11 16 33.72	2.0544	7 48 21.9	15.777
5	9 34 2.82	2.3364	19 15 4.8	12.838	5	11 18 36.86	2.0504	7 32 34.5	15.803
6	9 36 22.78	2.3289	19 2 11.4	12.941	6	11 20 39.76	2.0465	7 16 45.6	15.827
7	9 38 42.29	2.3214	18 49 11 9	13.042	7	11 22 42.43	2.0427	7 0 55.4	15.849
8	9 41 1.35	2.3139	18 36 6.4	13.140	8	11 24 44.88	2.0390	6 45 3.8	15.870
9	9 43 19.96	2.3065	18 22 55.1	13.236	9	11 26 47.11	2.0354	6 29 10.9	15.890
10	9 45 38.12	2.2991	18 9 38.0	13.331	10	11 28 49.12	2.0318	6 13 16.9	15.909
11	9 47 55.85	2.2918	17 56 15.3	13.424	11	11 30 50.92	2.0283	5 57 21.9	15.926
12	9 50 13.14	2.2846	17 42 47.1	13.515	12	11 32 52.52	2.0250	5 41 25.9	15.941
13	9 52 29.99	2.2774	17 29 13.5	13.604	13	11 34 53.92	2.0218	5 25 29.0	15.955
14	9 54 46.42	2.2702	17 15 34.6	13.692	14	11 36 55.13	2.0186	5 9 31.2	15.969
15	9 57 2.41	2.2631	17 1 50.5	13.778	15	11 38 56.15	2.0155	4 53 32.7	15.981
16	9 59 17.98	2.2561	16 48 1.3	13.861	16	11 40 56.99	2.0125	4 37 33.5	15.991
17	10 1 33.13	2.2491	16 34 7.2	13.943	17	11 42 57.66	2.0096	4 21 33.7	16.001
18	10 3 47.87	2.2422	16 20 8.2	14.024	18	11 44 58.15	2.0068	4 5 33.4	16.009
19	10 6 2.19	2.2354	16 6 4.4	14.102	19	11 46 58.48	2.0041	3 49 32.7	16.015
20	10 8 16.11	2.2286	15 51 55.9	14.178	20	11 48 58.65	2.0015	3 33 31.6	16.021
21	10 10 29.62	2.2219	15 37 42.9	14.253	21	11 50 58.66	1.9990	3 17 30.2	16.026
22	10 12 42.73	2.2153	15 23 25.5	14.327	22	11 52 58.53	1.9966	3 1 28.6	16.029
23	10 14 55.44	2.2087	15 9 3.7	14.399	23	11 54 58.25	1.9942	2 45 26.8	16.030
24	10 17 7.77	2.2022	N.14 54 37.6	14.468	24	11 56 57.84	1.9919	N. 2 29 25.0	16.030

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	SATURDAY 25.					MONDAY 27.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	11 56 57.84	1.9919	N. 2 29 25.0	16.030	0	13 31 37.57	1.9832	S. 9 58 26.8	14.701
1	11 58 57.29	1.9898	2 13 23.2	16.029	1	13 33 36.61	1.9849	10 13 7.2	14.646
2	12 0 56.62	1.9878	1 57 21.5	16.027	2	13 35 35.76	1.9867	10 27 44.3	14.590
3	12 2 55.82	1.9858	1 41 19.9	16.024	3	13 37 35.02	1.9885	10 42 18.0	14.533
4	12 4 54.91	1.9839	1 25 18.5	16.020	4	13 39 34.38	1.9904	10 56 48.2	14.475
5	12 6 53.89	1.9821	1 9 17.4	16.015	5	13 41 33.86	1.9923	11 11 15.0	14.416
6	12 8 52.76	1.9804	0 53 16.7	16.008	6	13 43 33.46	1.9943	11 25 38.2	14.356
7	12 10 51.53	1.9788	0 37 16.5	16.000	7	13 45 33.18	1.9964	11 39 57.8	14.295
8	12 12 50.21	1.9772	0 21 16.8	15.991	8	13 47 33.02	1.9985	11 54 13.7	14.233
9	12 14 48.80	1.9757	N. 0 5 17.7	15.981	9	13 49 32.99	2.0007	12 8 25.8	14.170
10	12 16 47.30	1.9744	S. 0 10 40.8	15.970	10	13 51 33.10	2.0029	12 22 34.1	14.106
11	12 18 45.73	1.9732	0 26 38.6	15.957	11	13 53 33.34	2.0052	12 36 38.5	14.041
12	12 20 44.08	1.9720	0 42 35.6	15.943	12	13 55 33.72	2.0076	12 50 39.0	13.974
13	12 22 42.36	1.9709	0 58 31.7	15.928	13	13 57 34.24	2.0100	13 4 35.4	13.906
14	12 24 40.58	1.9699	1 14 26.9	15.911	14	13 59 34.91	2.0124	13 18 27.8	13.838
15	12 26 38.74	1.9689	1 30 21.0	15.894	15	14 1 35.73	2.0149	13 32 16.0	13.770
16	12 28 36.85	1.9680	1 46 14.1	15.876	16	14 3 36.70	2.0175	13 46 0.1	13.700
17	12 30 34.91	1.9673	2 2 6.1	15.856	17	14 5 37.82	2.0201	13 59 39.9	13.627
18	12 32 32.93	1.9667	2 17 56.9	15.835	18	14 7 39.11	2.0227	14 13 15.3	13.554
19	12 34 30.91	1.9661	2 33 46.4	15.813	19	14 9 40.55	2.0254	14 26 46.4	13.481
20	12 36 28.86	1.9656	2 49 34.5	15.790	20	14 11 42.16	2.0282	14 40 13.0	13.406
21	12 38 26.78	1.9652	3 5 21.2	15.766	21	14 13 43.94	2.0310	14 53 35.1	13.330
22	12 40 24.67	1.9648	3 21 6.5	15.741	22	14 15 45.89	2.0339	15 6 52.7	13.254
23	12 42 22.55	1.9645	S. 3 36 50.2	15.715	23	14 17 48.01	2.0368	S. 15 20 5.6	13.177
	SUNDAY 26.					TUESDAY 28.			
0	12 44 20.42	1.9643	S. 3 52 32.3	15.688	0	14 19 50.30	2.0397	S. 15 33 13.8	13.098
1	12 46 18.28	1.9642	4 8 12.7	15.659	1	14 21 52.77	2.0427	15 46 17.2	13.017
2	12 48 16.13	1.9642	4 23 51.3	15.629	2	14 23 55.42	2.0457	15 59 15.8	12.936
3	12 50 13.99	1.9643	4 39 28.1	15.598	3	14 25 58.25	2.0488	16 12 9.6	12.855
4	12 52 11.85	1.9645	4 55 3.1	15.566	4	14 28 1.27	2.0519	16 24 58.4	12.772
5	12 54 9.72	1.9647	5 10 36.1	15.533	5	14 30 4.48	2.0550	16 37 42.1	12.687
6	12 56 7.62	1.9650	5 26 7.1	15.499	6	14 32 7.88	2.0582	16 50 20.8	12.602
7	12 58 5.53	1.9654	5 41 36.1	15.464	7	14 34 11.47	2.0614	17 2 54.4	12.516
8	13 0 3.47	1.9659	5 57 2.9	15.428	8	14 36 15.25	2.0647	17 15 22.7	12.429
9	13 2 1.43	1.9664	6 12 27.5	15.391	9	14 38 19.23	2.0680	17 27 45.8	12.341
10	13 3 59.43	1.9670	6 27 49.8	15.352	10	14 40 23.40	2.0713	17 40 3.6	12.251
11	13 5 57.47	1.9677	6 43 9.7	15.312	11	14 42 27.78	2.0747	17 52 16.0	12.161
12	13 7 55.56	1.9684	6 58 27.3	15.272	12	14 44 32.36	2.0780	18 4 23.0	12.070
13	13 9 53.69	1.9693	7 13 42.4	15.231	13	14 46 37.14	2.0814	18 16 24.5	11.978
14	13 11 51.87	1.9703	7 28 54.9	15.188	14	14 48 42.13	2.0849	18 28 20.4	11.885
15	13 13 50.12	1.9713	7 44 4.8	15.144	15	14 50 47.32	2.0883	18 40 10.7	11.791
16	13 15 48.42	1.9723	7 59 12.1	15.099	16	14 52 52.72	2.0917	18 51 55.3	11.696
17	13 17 46.79	1.9734	8 14 16.7	15.053	17	14 54 58.32	2.0952	19 3 34.1	11.599
18	13 19 45.23	1.9746	8 29 18.5	15.006	18	14 57 4.14	2.0987	19 15 7.1	11.502
19	13 21 43.74	1.9759	8 44 17.4	14.958	19	14 59 10.17	2.1022	19 26 34.3	11.404
20	13 23 42.33	1.9773	8 59 13.4	14.909	20	15 1 16.41	2.1058	19 37 55.6	11.304
21	13 25 41.01	1.9787	9 14 6.4	14.858	21	15 3 22.86	2.1093	19 49 10.9	11.204
22	13 27 39.77	1.9801	9 28 56.3	14.806	22	15 5 29.52	2.1128	20 0 20.2	11.103
23	13 29 38.62	1.9816	9 43 43.1	14.754	23	15 7 36.40	2.1164	20 11 23.3	11.001
24	13 31 37.57	1.9832	S. 9 58 26.8	14.701	24	15 9 43.50	2.1200	S. 20 22 20.3	10.898

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	WEDNESDAY 29.			
	h m s	s	° ′ ″	″
0	15 9 43.50	2.1200	S. 20 22 20.3	10.898
1	15 11 50.81	2.1236	20 33 11.0	10.794
2	15 13 58.33	2.1272	20 43 55.5	10.689
3	15 16 6.07	2.1308	20 54 33.7	10.583
4	15 18 14.03	2.1344	21 5 5.5	10.477
5	15 20 22.20	2.1380	21 15 30.9	10.369
6	15 22 30.59	2.1416	21 25 49.8	10.260
7	15 24 39.19	2.1452	21 36 2.1	10.150
8	15 26 48.01	2.1488	21 46 7.8	10.039
9	15 28 57.05	2.1524	21 56 6.8	9.928
10	15 31 6.30	2.1559	22 5 59.1	9.816
11	15 33 15.76	2.1595	22 15 44.7	9.703
12	15 35 25.44	2.1631	22 25 23.4	9.588
13	15 37 35.33	2.1667	22 34 55.3	9.473
14	15 39 45.44	2.1703	22 44 20.2	9.357
15	15 41 55.76	2.1738	22 53 38.1	9.240
16	15 44 6.29	2.1772	23 2 49.0	9.123
17	15 46 17.02	2.1807	23 11 52.8	9.004
18	15 48 27.97	2.1842	23 20 49.5	8.885
19	15 50 39.12	2.1876	23 29 39.0	8.765
20	15 52 50.48	2.1910	23 38 21.3	8.643
21	15 55 2.04	2.1943	23 46 56.2	8.522
22	15 57 13.80	2.1977	23 55 23.9	8.400
23	15 59 25.77	2.2011	S. 24 3 44.2	8.276
	THURSDAY 30.			
0	16 1 37.93	2.2043	S. 24 11 57.0	8.152
1	16 3 50.29	2.2076	24 20 2.4	8.027
2	16 6 2.84	2.2108	24 28 0.2	7.901
3	16 8 15.59	2.2140	24 35 50.5	7.775
4	16 10 28.52	2.2171	24 43 33.2	7.648
5	16 12 41.64	2.2202	24 51 8.3	7.520
6	16 14 54.94	2.2232	24 58 35.6	7.391
7	16 17 8.42	2.2262	25 5 55.2	7.262
8	16 19 22.08	2.2292	25 13 7.0	7.132
9	16 21 35.92	2.2321	25 20 11.0	7.002
10	16 23 49.93	2.2349	25 27 7.2	6.870
11	16 26 4.11	2.2377	25 33 55.4	6.738
12	16 28 18.46	2.2405	25 40 35.7	6.605
13	16 30 32.97	2.2432	25 47 8.0	6.472
14	16 32 47.64	2.2458	25 53 32.3	6.338
15	16 35 2.46	2.2483	25 59 48.6	6.204
16	16 37 17.44	2.2509	26 5 56.8	6.069
17	16 39 32.57	2.2533	26 11 56.9	5.934
18	16 41 47.83	2.2557	26 17 48.9	5.798
19	16 44 3.24	2.2580	26 23 32.7	5.662
20	16 46 18.79	2.2602	26 29 8.3	5.524
21	16 48 34.47	2.2624	26 34 35.6	5.387
22	16 50 50.28	2.2645	26 39 54.7	5.249
23	16 53 6.21	2.2665	26 45 5.5	5.111
24	16 55 22.26	2.2684	S. 26 50 8.0	4.972

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	FRIDAY 31.			
	h m s	s	° ′ ″	″
0	16 55 22.26	2.2684	S. 26 50 8.0	4.972
1	16 57 38.42	2.2703	26 55 2.1	4.833
2	16 59 54.70	2.2722	26 59 47.9	4.693
3	17 2 11.09	2.2739	27 4 25.3	4.553
4	17 4 27.57	2.2755	27 8 54.2	4.412
5	17 6 44.15	2.2772	27 13 14.7	4.272
6	17 9 0.83	2.2787	27 17 26.8	4.131
7	17 11 17.59	2.2800	27 21 30.4	3.988
8	17 13 34.43	2.2813	27 25 25.4	3.847
9	17 15 51.35	2.2826	27 29 12.0	3.706
10	17 18 8.34	2.2838	27 32 50.1	3.563
11	17 20 25.40	2.2848	27 36 19.6	3.420
12	17 22 42.52	2.2858	27 39 40.5	3.278
13	17 24 59.69	2.2867	27 42 52.9	3.135
14	17 27 16.92	2.2876	27 45 56.7	2.991
15	17 29 34.20	2.2883	27 48 51.8	2.848
16	17 31 51.51	2.2888	27 51 38.4	2.705
17	17 34 8.86	2.2894	27 54 16.4	2.561
18	17 36 26.24	2.2898	27 56 45.7	2.417
19	17 38 43.64	2.2902	27 59 6.4	2.273
20	17 41 1.06	2.2904	28 1 18.5	2.130
21	17 43 18.49	2.2906	28 3 22.0	1.986
22	17 45 35.93	2.2907	28 5 16.8	1.842
23	17 47 53.37	2.2907	S. 28 7 3.0	1.698
	SATURDAY, JUNE 1.			
0	17 50 10.81	2.2906	S. 28 8 40.5	1.554

PHASES OF THE MOON.

			d	h	m
☾	Last Quarter	May	8	21	56.1
●	New Moon		16	10	13.6
☽	First Quarter		23	2	11.3
○	Full Moon		30	11	29.6

			d	h
☾	Apogee	May	7	8.0
☾	Perigee		19	4.6

AT GREENWICH APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S					Sidereal Time of Semidiameter Passing Meridian.	Equation of Time, to be Subtracted from	Diff. for 1 Hour.
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.	Semidiameter.		Added to Apparent Time.	
		h m s	s	° ′ ″	″	′ ″	s	m s	s
Sat.	1	4 35 58.34	10.226	N. 22 2 52.4	+20.50	15 47.95	68.37	2 25.28	0.369
SUN.	2	4 40 3.97	10.243	22 10 52.7	19.54	15 47.81	68.43	2 16.24	0.385
Mon.	3	4 44 9.99	10.259	22 18 29.8	18.57	15 47.67	68.49	2 6.80	0.401
Tues.	4	4 48 16.40	10.274	22 25 43.7	+17.59	15 47.54	68.54	1 56.97	0.417
Wed.	5	4 52 23.18	10.289	22 32 34.1	16.61	15 47.41	68.59	1 46.77	0.432
Thur.	6	4 56 30.30	10.303	22 39 0.9	15.62	15 47.28	68.64	1 36.23	0.446
Frid.	7	5 0 37.76	10.317	22 45 4.0	+14.63	15 47.16	68.68	1 25.36	0.459
Sat.	8	5 4 45.54	10.330	22 50 43.2	13.63	15 47.04	68.72	1 14.18	0.472
SUN.	9	5 8 53.61	10.342	22 55 58.3	12.63	15 46.92	68.75	1 2.70	0.484
Mon.	10	5 13 1.95	10.353	23 0 49.3	+11.62	15 46.81	68.78	0 50.96	0.495
Tues.	11	5 17 10.55	10.363	23 5 16.0	10.61	15 46.71	68.81	0 38.96	0.505
Wed.	12	5 21 19.37	10.372	23 9 18.4	9.59	15 46.62	68.84	0 26.73	0.514
Thur.	13	5 25 28.39	10.380	23 12 56.3	+ 8.57	15 46.53	68.86	0 14.30	0.521
Frid.	14	5 29 37.59	10.386	23 16 9.6	7.54	15 46.44	68.88	0 1.69	0.528
Sat.	15	5 33 46.93	10.391	23 18 58.2	6.51	15 46.36	68.90	0 11.06	0.533
SUN.	16	5 37 56.39	10.395	23 21 22.1	+ 5.48	15 46.28	68.91	0 23.93	0.537
Mon.	17	5 42 5.94	10.399	23 23 21.2	4.45	15 46.20	68.92	0 36.90	0.540
Tues.	18	5 46 15.56	10.401	23 24 55.5	3.41	15 46.13	68.93	0 49.92	0.542
Wed.	19	5 50 25.21	10.402	23 26 5.0	+ 2.38	15 46.08	68.93	1 2.97	0.543
Thur.	20	5 54 34.87	10.401	23 26 49.7	1.34	15 46.03	68.94	1 16.03	0.544
Frid.	21	5 58 44.51	10.400	23 27 9.5	+ 0.31	15 45.98	68.94	1 29.08	0.543
Sat.	22	6 2 54.10	10.398	23 27 4.5	− 0.72	15 45.94	68.93	1 42.08	0.540
SUN.	23	6 7 3.63	10.394	23 26 34.7	1.76	15 45.90	68.93	1 55.02	0.536
Mon.	24	6 11 13.07	10.390	23 25 40.1	2.79	15 45.86	68.92	2 7.87	0.532
Tues.	25	6 15 22.40	10.385	23 24 20.7	− 3.82	15 45.82	68.91	2 20.60	0.528
Wed.	26	6 19 31.60	10.380	23 22 36.7	4.85	15 45.79	68.89	2 33.20	0.523
Thur.	27	6 23 40.65	10.373	23 20 28.0	5.87	15 45.76	68.87	2 45.65	0.516
Frid.	28	6 27 49.53	10.366	23 17 54.8	− 6.89	15 45.73	68.85	2 57.94	0.508
Sat.	29	6 31 58.22	10.358	23 14 57.2	7.91	15 45.71	68.82	3 10.05	0.500
SUN.	30	6 36 6.70	10.349	23 11 35.1	8.92	15 45.69	68.79	3 21.95	0.491
Mon.	31	6 40 14.96	10.340	N. 23 7 48.6	− 9.93	15 45.68	68.76	3 33.61	0.481

NOTE.—The mean time of semidiameter passing may be found by subtracting $0^s.19$ from the sidereal time.

The sign + prefixed to the hourly change of declination indicates that north declinations are increasing; the sign − indicates that north declinations are decreasing.

AT GREENWICH MEAN NOON.

Day of the Week.	Day of the Month.	THE SUN'S Apparent Right Ascension.	THE SUN'S Diff. for 1 Hour.	THE SUN'S Apparent Declination.	THE SUN'S Diff. for 1 Hour.	Equation of Time, to be Added to / Subtracted from Mean Time.	Diff. for 1 Hour.	Sidereal Time, or Right Ascension of Mean Sun.
		h m s	s	° ′ ″	″	m s	s	h m s
Sat.	1	4 35 58.74	10.225	N. 22 2 53.2	+20.49	2 25.28	0.369	4 38 24.02
SUN.	2	4 40 4.35	10.242	22 10 53.4	19.53	2 16.23	0.385	4 42 20.58
Mon.	3	4 44 10.35	10.258	22 18 30.5	18.56	2 6.78	0.401	4 46 17.13
Tues.	4	4 48 16.74	10.273	22 25 44.3	+17.59	1 56.95	0.417	4 50 13.69
Wed.	5	4 52 23.49	10.288	22 32 34.6	16.61	1 46.76	0.432	4 54 10.25
Thur.	6	4 56 30.58	10.302	22 39 1.3	15.62	1 36.22	0.446	4 58 6.81
Frid.	7	5 0 38.01	10.316	22 45 4.3	+14.63	1 25.35	0.459	5 2 3.37
Sat.	8	5 4 45.76	10.328	22 50 43.5	13.64	1 14.17	0.472	5 5 59.93
SUN.	9	5 8 53.80	10.340	22 55 58.6	12.63	1 2.69	0.484	5 9 56.48
Mon.	10	5 13 2.10	10.351	23 0 49.5	+11.62	0 50.94	0.495	5 13 53.04
Tues.	11	5 17 10.65	10.361	23 5 16.2	10.61	0 38.95	0.505	5 17 49.60
Wed.	12	5 21 19.43	10.371	23 9 18.5	9.59	0 26.73	0.513	5 21 46.16
Thur.	13	5 25 28.42	10.379	23 12 56.3	+ 8.57	0 14.30	0.521	5 25 42.72
Frid.	14	5 29 37.59	10.385	23 16 9.6	7.54	0 1.69	0.528	5 29 39.28
Sat.	15	5 33 46.90	10.390	23 18 58.2	6.51	0 11.06	0.533	5 33 35.84
SUN.	16	5 37 56.33	10.394	23 21 22.1	+ 5.48	0 23.93	0.537	5 37 32.39
Mon.	17	5 42 5.84	10.398	23 23 21.2	4.45	0 36.89	0.541	5 41 28.95
Tues.	18	5 46 15.42	10.400	23 24 55.5	3.41	0 49.91	0.543	5 45 25.51
Wed.	19	5 50 25.03	10.401	23 26 5.0	+ 2.38	1 2.96	0.544	5 49 22.07
Thur.	20	5 54 34.65	10.401	23 26 49.7	1.34	1 16.02	0.544	5 53 18.63
Frid.	21	5 58 44.25	10.399	23 27 9.5	+ 0.31	1 29.07	0.543	5 57 15.19
Sat.	22	6 2 53.81	10.397	23 27 4.5	− 0.72	1 42.07	0.540	6 1 11.75
SUN.	23	6 7 3.30	10.393	23 26 34.7	1.76	1 55.00	0.537	6 5 8.30
Mon.	24	6 11 12.70	10.389	23 25 40.1	2.79	2 7.84	0.533	6 9 4.86
Tues.	25	6 15 22.00	10.384	23 24 20.8	− 3.82	2 20.58	0.528	6 13 1.42
Wed.	26	6 19 31.17	10.379	23 22 36.9	4.85	2 33.19	0.522	6 16 57.98
Thur.	27	6 23 40.18	10.372	23 20 28.3	5.87	2 45.64	0.515	6 20 54.54
Frid.	28	6 27 49.02	10.365	23 17 55.2	− 6.89	2 57.92	0.508	6 24 51.10
Sat.	29	6 31 57.68	10.356	23 14 57.6	7.91	3 10.02	0.500	6 28 47.66
SUN.	30	6 36 6.13	10.347	23 11 35.6	8.92	3 21.92	0.491	6 32 44.22
Mon.	31	6 40 14.36	10.338	N. 23 7 49.2	− 9.93	3 33.58	0.481	6 36 40.77

NOTE.—The semidiameter for mean noon may be assumed the same as that for apparent noon. The sign + prefixed to the hourly change of declination indicates that north declinations are increasing; the sign − indicates that north declinations are decreasing.

Diff. for 1 Hour, $+9^s.8565$. (Table III.)

AT GREENWICH MEAN NOON.

Day of the Month.	Day of the Year.	THE SUN'S				Logarithm of the Radius Vector of the Earth.	Diff. for 1 Hour.	Mean Time of Sidereal Noon.
		True Longitude.		Diff. for 1 Hour.	Latitude.			
		λ	λ'					
		° ′ ″	′ ″	″	″			h m s
1	153	70 36 3.0	35 48.4	143.63	−0.79	0.006 1630	+26.7	19 18 25.68
2	154	71 33 29.7	33 14.9	143.59	0.83	0.006 2264	26.2	19 14 29.77
3	155	72 30 55.6	30 40.6	143.56	0.84	0.006 2884	25.6	19 10 33.86
4	156	73 28 20.7	28 5.5	143.53	−0.82	0.006 3490	+25.0	19 6 37.94
5	157	74 25 45.1	25 29.7	143.50	0.78	0.006 4081	24.3	19 2 42.03
6	158	75 23 8.8	22 53.2	143.47	0.71	0.006 4657	23.6	18 58 46.12
7	159	76 20 31.9	20 16.1	143.45	−0.62	0.006 5216	+22.9	18 54 50.21
8	160	77 17 54.4	17 38.4	143.43	0.51	0.006 5757	22.1	18 50 54.30
9	161	78 15 16.4	15 0.3	143.41	0.39	0.006 6279	21.3	18 46 58.38
10	162	79 12 37.9	12 21.6	143.39	−0.26	0.006 6780	+20.4	18 43 2.47
11	163	80 9 58.9	9 42.4	143.37	−0.13	0.006 7260	19.5	18 39 6.56
12	164	81 7 19.5	7 2.8	143.34	0.00	0.006 7717	18.5	18 35 10.64
13	165	82 4 39.5	4 22.6	143.32	+0.11	0.006 8149	+17.5	18 31 14.73
14	166	83 1 59.0	1 41.9	143.30	0.19	0.006 8556	16.4	18 27 18.82
15	167	83 59 18.0	59 0.7	143.28	0.25	0.006 8936	15.3	18 23 22.91
16	168	84 56 36.4	56 18.9	143.25	+0.28	0.006 9290	+14.2	18 19 26.99
17	169	85 53 54.1	53 36.4	143.22	0.28	0.006 9618	13.1	18 15 31.08
18	170	86 51 11.1	50 53.3	143.19	0.25	0.006 9921	12.1	18 11 35.17
19	171	87 48 27.4	48 9.4	143.16	+0.18	0.007 0199	+11.1	18 7 39.26
20	172	88 45 43.0	45 24.8	143.13	+0.09	0.007 0453	10.2	18 3 43.34
21	173	89 42 57.8	42 39.4	143.10	−0.02	0.007 0686	9.3	17 59 47.43
22	174	90 40 12.0	39 53.3	143.07	−0.14	0.007 0898	+ 8.5	17 55 51.52
23	175	91 37 25.5	37 6.6	143.05	0.27	0.007 1090	7.7	17 51 55.60
24	176	92 34 38.3	34 19.3	143.02	0.39	0.007 1264	6.9	17 47 59.69
25	177	93 31 50.6	31 31.4	143.00	−0.50	0.007 1422	+ 6.2	17 44 3.78
26	178	94 29 2.4	28 43.0	142.98	0.60	0.007 1564	5.5	17 40 7.87
27	179	95 26 13.9	25 54.3	142.97	0.69	0.007 1690	4.9	17 36 11.95
28	180	96 23 25.1	23 5.3	142.96	−0.76	0.007 1800	+ 4.3	17 32 16.04
29	181	97 20 36.0	20 16.1	142.95	0.80	0.007 1895	3.7	17 28 20.13
30	182	98 17 46.8	17 26.7	142.95	0.80	0.007 1975	3.1	17 24 24.22
31	183	99 14 57.6	14 37.2	142.95	−0.79	0.007 2040	+ 2.4	17 20 28.30

NOTE.—The longitudes in the column λ are referred to the true equinox of their own date, while those in the column λ' are referred to the mean equinox of the beginning of the Besselian fictitious year.

Diff. for 1 Hour, $-9^s.8296$. (Table II.)

GREENWICH MEAN TIME.

Day of the Month.	THE MOON'S								
	SEMIDIAMETER.		HORIZONTAL PARALLAX.				UPPER TRANSIT.		AGE.
	Noon.	Midnight.	Noon.	Diff. for 1 Hour.	Midnight.	Diff. for 1 Hour.	Meridian of Greenwich.	Diff. for 1 Hour.	Noon.
	′ ″	′ ″	′ ″	″	′ ″	″	h m	m	d
1	14 55.1	14 52.6	54 39.2	−0.82	54 29.9	−0.72	13 40.8	2.19	15.6
2	14 50.4	14 48.6	54 21.9	0.61	54 15.3	0.48	14 32.8	2.13	16.6
3	14 47.2	14 46.4	54 10.4	0.33	54 7.3	−0.18	15 22.6	2.02	17.6
4	14 46.1	14 46.4	54 6.2	−0.01	54 7.1	+0.17	16 9.8	1.91	18.6
5	14 47.2	14 48.7	54 10.3	+0.36	54 15.8	0.56	16 54.3	1.80	19.6
6	14 50.9	14 53.7	54 23.7	0.76	54 34.0	0.96	17 36.7	1.73	20.6
7	14 57.2	15 1.3	54 46.8	+1.17	55 2.1	+1.37	18 17.9	1.71	21.6
8	15 6.1	15 11.6	55 19.7	1.57	55 39.6	1.75	18 59.0	1.73	22.6
9	15 17.6	15 24.1	56 1.6	1.91	56 25.5	2.05	19 41.3	1.81	23.6
10	15 31.0	15 38.2	56 50.9	+2.16	57 17.4	+2.24	20 26.2	1.95	24.6
11	15 45.6	15 53.1	57 44.6	2.28	58 12.1	2.28	21 15.2	2.14	25.6
12	16 0.5	16 7.6	58 39.2	2.22	59 5.3	2.11	22 9.4	2.38	26.6
13	16 14.3	16 20.3	59 29.8	+1.95	59 52.0	+1.73	23 9.6	2.62	27.6
14	16 25.6	16 30.0	60 11.4	1.48	60 27.4	1.18	6	. .	28.6
15	16 33.3	16 35.5	60 39.6	0.84	60 47.6	+0.49	0 14.6	2.77	0.2
16	16 36.5	16 36.4	60 51.4	+0.13	60 50.9	−0.22	1 21.5	2.75	1.2
17	16 35.1	16 32.8	60 46.2	−0.55	60 37.6	0.86	2 26.6	2.63	2.2
18	16 29.5	16 25.4	60 25.5	1.13	60 10.5	1.36	3 27.0	2.40	3.2
19	16 20.6	16 15.3	59 53.0	−1.54	59 33.6	−1.68	4 22.0	2.19	4.2
20	16 9.6	16 3.7	59 12.7	1.78	58 50.9	1.83	5 12.3	2.02	5.2
21	15 57.7	15 51.6	58 28.7	1.85	58 6.4	1.85	5 59.2	1.91	6.2
22	15 45.6	15 39.7	57 44.4	−1.81	57 23.0	−1.75	6 44.3	1.86	7.2
23	15 34.1	15 28.7	57 2.3	1.68	56 42.5	1.60	7 29.0	1.87	8.2
24	15 23.6	15 18.8	56 23.8	1.51	56 6.2	1.42	8 14.5	1.93	9.2
25	15 14.3	15 10.1	55 49.7	−1.33	55 34.3	−1.24	9 1.8	2.01	10.2
26	15 6.2	15 2.6	55 20.0	1.14	55 6.9	1.05	9 51.2	2.10	11.2
27	14 59.4	14 56.4	54 54.9	0.96	54 43.9	0.87	10 42.5	2.17	12.2
28	14 53.7	14 51.3	54 34.1	−0.77	54 25.4	−0.68	11 35.0	2.19	13.2
29	14 49.3	14 47.6	54 17.9	0.58	54 11.6	0.48	12 27.2	2.15	14.2
30	14 46.2	14 45.2	54 6.5	0.37	54 2.7	−0.26	13 17.7	2.06	15.2
31	14 44.5	14 44.3	54 0.3	−0.14	53 59.4	0.00	14 5.8	1.95	16.2
32	14 44.5	14 45.2	54 0.2	+0.14	54 2.7	+0.28	14 51.1	1.83	17.2

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	SATURDAY 1.					MONDAY 3.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	17 50 10.81	2.2906	S.28 8 40.5	1.554	0	19 38 18.85	2.1849	S.26 41 36.0	5.020
1	17 52 28.24	2.2904	28 10 9.4	1.410	1	19 40 29.83	2.1810	26 36 31.1	5.144
2	17 54 45.66	2.2901	28 11 29.6	1.266	2	19 42 40.57	2.1771	26 31 18.8	5.267
3	17 57 3.05	2.2897	28 12 41.2	1.122	3	19 44 51.07	2.1732	26 25 59.1	5.389
4	17 59 20.42	2.2892	28 13 44.2	0.978	4	19 47 1.34	2.1692	26 20 32.1	5.511
5	18 1 37.76	2.2887	28 14 38.6	0.834	5	19 49 11.37	2.1652	26 14 57.8	5.632
6	18 3 55.05	2.2880	28 15 24.3	0.690	6	19 51 21.16	2.1611	26 9 16.3	5.752
7	18 6 12.31	2.2872	28 16 1.4	0.547	7	19 53 30.70	2.1570	26 3 27.6	5.871
8	18 8 29.52	2.2864	28 16 29.9	0.404	8	19 55 39.99	2.1529	25 57 31.8	5.989
9	18 10 46.67	2.2855	28 16 49.8	0.260	9	19 57 49.04	2.1487	25 51 28.9	6.107
10	18 13 3.77	2.2844	28 17 1.1	−0.117	10	19 59 57.83	2.1445	25 45 19.0	6.224
11	18 15 20.80	2.2832	28 17 3.9	+0.026	11	20 2 6.37	2.1403	25 39 2.0	6.340
12	18 17 37.75	2.2820	28 16 58.1	0.169	12	20 4 14.66	2.1360	25 32 38.1	6.456
13	18 19 54.63	2.2807	28 16 43.7	0.311	13	20 6 22.69	2.1317	25 26 7.3	6.571
14	18 22 11.43	2.2793	28 16 20.8	0.453	14	20 8 30.46	2.1274	25 19 29.6	6.685
15	18 24 28.14	2.2778	28 15 49.4	0.595	15	20 10 37.98	2.1231	25 12 45.0	6.798
16	18 26 44.76	2.2762	28 15 9.5	0.736	16	20 12 45.24	2.1188	25 5 53.7	6.910
17	18 29 1.29	2.2745	28 14 21.1	0.877	17	20 14 52.24	2.1144	24 58 55.7	7.022
18	18 31 17.71	2.2727	28 13 24.3	1.018	18	20 16 58.98	2.1101	24 51 51.0	7.133
19	18 33 34.02	2.2709	28 12 19.0	1.158	19	20 19 5.45	2.1058	24 44 39.7	7.243
20	18 35 50.22	2.2690	28 11 5.3	1.298	20	20 21 11.66	2.1014	24 37 21.9	7.352
21	18 38 6.29	2.2670	28 9 43.2	1.438	21	20 23 17.61	2.0970	24 29 57.5	7.460
22	18 40 22.25	2.2649	28 8 12.7	1.577	22	20 25 23.30	2.0926	24 22 26.6	7.568
23	18 42 38.08	2.2627	S.28 6 33.9	1.716	23	20 27 28.72	2.0882	S.24 14 49.3	7.675
	SUNDAY 2.					TUESDAY 4.			
0	18 44 53.77	2.2604	S.28 4 46.8	1.855	0	20 29 33.88	2.0838	S.24 7 5.7	7.781
1	18 47 9.32	2.2580	28 2 51.4	1.993	1	20 31 38.77	2.0794	23 59 15.7	7.886
2	18 49 24.73	2.2556	28 0 47.7	2.131	2	20 33 43.40	2.0749	23 51 19.4	7.990
3	18 51 40.00	2.2531	27 58 35.7	2.268	3	20 35 47.76	2.0704	23 43 16.8	8.094
4	18 53 55.11	2.2505	27 56 15.5	2.405	4	20 37 51.86	2 0660	23 35 8.1	8.197
5	18 56 10.07	2.2479	27 53 47.1	2.542	5	20 39 55.69	2.0616	23 26 53.3	8.298
6	18 58 24.86	2.2452	27 51 10.5	2.677	6	20 41 59.25	2.0572	23 18 32.4	8.399
7	19 0 39.49	2.2424	27 48 25.8	2.812	7	20 44 2.55	2.0528	23 10 5.4	8.500
8	19 2 53.94	2.2395	27 45 33.1	2.947	8	20 46 5.59	2.0484	23 1 32.5	8.599
9	19 5 8.22	2.2365	27 42 32.3	3.081	9	20 48 8.37	2.0440	22 52 53.6	8.697
10	19 7 22.33	2.2335	27 39 23.4	3.215	10	20 50 10.88	2.0397	22 44 8.9	8.795
11	19 9 36.25	2.2304	27 36 6.5	3.348	11	20 52 13.13	2.0354	22 35 18.3	8.892
12	19 11 49.98	2.2273	27 32 41.7	3.480	12	20 54 15.12	2.0310	22 26 21.9	8.988
13	19 14 3.52	2.2242	27 29 8.9	3.612	13	20 56 16.85	2.0266	22 17 19.8	9.083
14	19 16 16.87	2.2209	27 25 28.2	3.743	14	20 58 18.32	2.0223	22 8 12.0	9.177
15	19 18 30.02	2.2175	27 21 39.7	3.874	15	21 0 19.53	2.0180	21 58 58.5	9.271
16	19 20 42.97	2.2141	27 17 43.4	4.004	16	21 2 20.48	2.0137	21 49 39.4	9.364
17	19 22 55.71	2.2106	27 13 39.3	4.133	17	21 4 21.18	2.0095	21 40 14.8	9.456
18	19 25 8.24	2.2071	27 9 27.4	4.262	18	21 6 21.62	2.0053	21 30 44.7	9.547
19	19 27 20.56	2.2036	27 5 7.8	4.390	19	21 8 21.81	2.0011	21 21 9.1	9.637
20	19 29 32.66	2.1999	27 0 40.6	4.517	20	21 10 21.75	1.9969	21 11 28.1	9.727
21	19 31 44.54	2.1962	26 56 5.8	4.643	21	21 12 21.43	1.9927	21 1 41.8	9.816
22	19 33 56.20	2.1925	26 51 23.4	4.769	22	21 14 20.87	1.9886	20 51 50.2	9.904
23	19 36 7.64	2.1887	26 46 33.4	4.895	23	21 16 20.06	1.9845	20 41 53.3	9.991
24	19 38 18.85	2.1849	S.26 41 36.0	5.020	24	21 18 19.01	1.9804	S.20 31 51.2	10.077

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	WEDNESDAY 5.					FRIDAY 7.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	21 18 19.01	1.9804	S.20 31 51.2	10.077	0	22 49 30.04	1.8395	S.11 3 7.5	13.340
1	21 20 17.71	1.9764	20 21 44.0	10.163	1	22 51 20.36	1.8380	10 49 45.6	13.391
2	21 22 16.17	1.9724	20 11 31.7	10.248	2	22 53 10.60	1.8366	10 36 20.6	13.441
3	21 24 14.39	1.9684	20 1 14.3	10.332	3	22 55 0.76	1.8353	10 22 52.7	13.490
4	21 26 12.38	1.9644	19 50 51.9	10.415	4	22 56 50.84	1.8340	10 9 21.8	13.538
5	21 28 10.13	1.9605	19 40 24.5	10.497	5	22 58 40.84	1.8328	9 55 48.1	13.586
6	21 30 7.64	1.9567	19 29 52.2	10.579	6	23 0 30.77	1.8317	9 42 11.5	13.633
7	21 32 4.93	1.9529	19 19 15.1	10.660	7	23 2 20.63	1.8306	9 28 32.1	13.680
8	21 34 1.99	1.9491	19 8 33.1	10.740	8	23 4 10.43	1.8296	9 14 49.9	13.726
9	21 35 58.82	1.9453	18 57 46.3	10.819	9	23 6 0.18	1.8287	9 1 5.0	13.771
10	21 37 55.43	1.9416	18 46 54.8	10.897	10	23 7 49.88	1.8278	8 47 17.4	13.816
11	21 39 51.81	1.9380	18 35 58.6	10.975	11	23 9 39.53	1.8271	8 33 27.1	13.859
12	21 41 47.98	1.9343	18 24 57.7	11.053	12	23 11 29.13	1.8264	8 19 34.3	13.902
13	21 43 43.93	1.9307	18 13 52.2	11.130	13	23 13 18.69	1.8257	8 5 38.9	13.945
14	21 45 39.67	1.9272	18 2 42.2	11.205	14	23 15 8.22	1.8252	7 51 41.0	13.987
15	21 47 35.19	1.9237	17 51 27.7	11.279	15	23 16 57.73	1.8248	7 37 40.6	14.028
16	21 49 30.51	1.9203	17 40 8.7	11.353	16	23 18 47.20	1.8244	7 23 37.7	14.068
17	21 51 25.62	1.9169	17 28 45.3	11.426	17	23 20 36.65	1.8241	7 9 32.4	14.108
18	21 53 20.53	1.9135	17 17 17.6	11.498	18	23 22 26.09	1.8239	6 55 24.8	14.147
19	21 55 15.24	1.9102	17 5 45.5	11.570	19	23 24 15.52	1.8237	6 41 14.8	14.185
20	21 57 9.76	1.9070	16 54 9.1	11.642	20	23 26 4.94	1.8236	6 27 2.6	14.223
21	21 59 4.08	1.9038	16 42 28.5	11.712	21	23 27 54.36	1.8236	6 12 48.1	14.260
22	22 0 58.21	1.9006	16 30 43.7	11.781	22	23 29 43.77	1.8237	5 58 31.4	14.296
23	22 2 52.16	1.8975	S.16 18 54.7	11.850	23	23 31 33.20	1.8239	S. 5 44 12.5	14.331
	THURSDAY 6.					SATURDAY 8.			
0	22 4 45.92	1.8945	S.16 7 1.7	11.918	0	23 33 22.64	1.8241	S. 5 29 51.5	14.366
1	22 6 39.50	1.8915	15 55 4.6	11.985	1	23 35 12.10	1.8243	5 15 28.5	14.401
2	22 8 32.90	1.8885	15 43 3.5	12.051	2	23 37 1.58	1.8248	5 1 3.5	14.434
3	22 10 26.13	1.8856	15 30 58.4	12.117	3	23 38 51.08	1.8253	4 46 36.5	14.467
4	22 12 19.18	1.8828	15 18 49.4	12.183	4	23 40 40.61	1.8259	4 32 7.5	14.499
5	22 14 12.07	1.8801	15 6 36.5	12.248	5	23 42 30.18	1.8265	4 17 36.6	14.530
6	22 16 4.80	1.8774	14 54 19.8	12.312	6	23 44 19.79	1.8272	4 3 3.9	14.561
7	22 17 57.36	1.8747	14 41 59.2	12.375	7	23 46 9.45	1.8280	3 48 29.4	14.591
8	22 19 49.77	1.8722	14 29 34.8	12.437	8	23 47 59.16	1.8289	3 33 53.1	14.620
9	22 21 42.03	1.8697	14 17 6.7	12.499	9	23 49 48.93	1.8299	3 19 15.0	14.648
10	22 23 34.14	1.8672	14 4 35.0	12.560	10	23 51 38.76	1.8310	3 4 35.3	14.675
11	22 25 26.10	1.8648	13 51 59.6	12.620	11	23 53 28.65	1.8322	2 49 54.0	14.702
12	22 27 17.92	1.8625	13 39 20.6	12.679	12	23 55 18.61	1.8334	2 35 11.1	14.728
13	22 29 9.60	1.8602	13 26 38.1	12.738	13	23 57 8.65	1.8346	2 20 26.7	14.753
14	22 31 1.15	1.8580	13 13 52.0	12.797	14	23 58 58.77	1.8360	2 5 40.8	14.778
15	22 32 52.56	1.8559	13 1 2.5	12.854	15	0 0 48.97	1.8375	1 50 53.4	14.802
16	22 34 43.85	1.8538	12 48 9.5	12.910	16	0 2 39.26	1.8390	1 36 4.6	14.825
17	22 36 35.01	1.8518	12 35 13.2	12.966	17	0 4 29.65	1.8407	1 21 14.4	14.847
18	22 38 26.05	1.8498	12 22 13.5	13.022	18	0 6 20.14	1.8425	1 6 22.9	14.868
19	22 40 16.98	1.8479	12 9 10.5	13.077	19	0 8 10.74	1.8443	0 51 30.2	14.888
20	22 42 7.80	1.8461	11 56 4.3	13.131	20	0 10 1.45	1.8462	0 36 36.3	14.908
21	22 43 58.51	1.8443	11 42 54.8	13.184	21	0 11 52.28	1.8482	0 21 41.2	14.927
22	22 45 49.12	1.8426	11 29 42.1	13.237	22	0 13 43.23	1.8502	S. 0 6 45.0	14.945
23	22 47 39.63	1.8410	11 16 26.3	13.289	23	0 15 34.31	1.8523	N. 0 8 12.3	14.963
24	22 49 30.04	1.8395	S.11 3 7.5	13.340	24	0 17 25.52	1.8546	N. 0 23 10.6	14.980

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	SUNDAY 9.					TUESDAY 11.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	0 17 25.52	1.8546	N. 0 23 10.6	14.980	0	1 50 47.26	2.0713	N. 12 22 43.0	14.566
1	0 19 16.87	1.8570	0 38 9.8	14.995	1	1 52 51.74	2.0781	12 37 15.8	14.526
2	0 21 8.36	1.8594	0 53 10.0	15.010	2	1 54 56.63	2.0850	12 51 46.2	14.485
3	0 23 0.00	1.8619	1 8 11.0	15.024	3	1 57 1.94	2.0919	13 6 14.1	14.443
4	0 24 51.79	1.8646	1 23 12.8	15.037	4	1 59 7.67	2.0990	13 20 39.3	14.399
5	0 26 43.75	1.8673	1 38 15.4	15.050	5	2 1 13.82	2.1062	13 35 1.8	14.353
6	0 28 35.87	1.8700	1 53 18.7	15.061	6	2 3 20.40	2.1134	13 49 21.6	14.306
7	0 30 28.15	1.8729	2 8 22.7	15.071	7	2 5 27.42	2.1207	14 3 38.5	14.257
8	0 32 20.61	1.8759	2 23 27.2	15.081	8	2 7 34.89	2.1281	14 17 52.4	14.206
9	0 34 13.26	1.8790	2 38 32.3	15.090	9	2 9 42.80	2.1356	14 32 3.3	14.154
10	0 36 6.10	1.8822	2 53 37.9	15.097	10	2 11 51.16	2.1432	14 46 10.9	14.100
11	0 37 59.13	1.8854	3 8 43.9	15.103	11	2 13 59.98	2.1508	15 0 15.2	14.044
12	0 39 52.35	1.8887	3 23 50.3	15.109	12	2 16 9.26	2.1585	15 14 16.2	13.987
13	0 41 45.77	1.8922	3 38 57.0	15.114	13	2 18 19.01	2.1663	15 28 13.7	13.928
14	0 43 39.41	1.8957	3 54 3.9	15.117	14	2 20 29.22	2.1742	15 42 7.5	13.867
15	0 45 33.26	1.8993	4 9 11.0	15.120	15	2 22 39.91	2.1822	15 55 57.6	13.804
16	0 47 27.33	1.9030	4 24 18.3	15.122	16	2 24 51.08	2.1902	16 9 43.9	13.739
17	0 49 21.62	1.9068	4 39 25.6	15.122	17	2 27 2.74	2.1983	16 23 26.3	13.673
18	0 51 16.14	1.9108	4 54 33.0	15.122	18	2 29 14.89	2.2065	16 37 4.7	13.605
19	0 53 10.90	1.9148	5 9 40.3	15.121	19	2 31 27.53	2.2148	16 50 38.9	13.535
20	0 55 5.91	1.9188	5 24 47.5	15.119	20	2 33 40.67	2.2232	17 4 8.8	13.463
21	0 57 1.16	1.9230	5 39 54.5	15.116	21	2 35 54.31	2.2316	17 17 34.4	13.389
22	0 58 56.66	1.9273	5 55 1.3	15.111	22	2 38 8.45	2.2400	17 30 55.5	13.314
23	1 0 52.43	1.9316	N. 6 10 7.8	15.105	23	2 40 23.10	2.2485	N. 17 44 12.0	13.236
	MONDAY 10.					WEDNESDAY 12.			
0	1 2 48.46	1.9361	N. 6 25 14.0	15.098	0	2 42 38.27	2.2571	N. 17 57 23.8	13.156
1	1 4 44.76	1.9407	6 40 19.7	15.090	1	2 44 53.95	2.2657	18 10 30.7	13.075
2	1 6 41.33	1.9453	6 55 24.8	15.081	2	2 47 10.16	2.2744	18 23 32.7	12.991
3	1 8 38.19	1.9500	7 10 29.4	15.071	3	2 49 26.89	2.2832	18 36 29.7	12.905
4	1 10 35.34	1.9549	7 25 33.4	15.060	4	2 51 44.15	2.2920	18 49 21.4	12.818
5	1 12 32.78	1.9598	7 40 36.6	15.048	5	2 54 1.93	2.3009	19 2 7.8	12.729
6	1 14 30.51	1.9648	7 55 39.1	15.035	6	2 56 20.25	2.3098	19 14 48.8	12.637
7	1 16 28.54	1.9699	8 10 40.8	15.020	7	2 58 39.11	2.3188	19 27 24.2	12.543
8	1 18 26.89	1.9751	8 25 41.5	15.004	8	3 0 58.51	2.3279	19 39 54.0	12.448
9	1 20 25.56	1.9805	8 40 41.2	14.987	9	3 3 18.45	2.3369	19 52 18.0	12.350
10	1 22 24.55	1.9859	8 55 39.8	14.968	10	3 5 38.93	2.3459	20 4 36.1	12.250
11	1 24 23.86	1.9914	9 10 37.3	14.948	11	3 7 59.96	2.3550	20 16 48.1	12.149
12	1 26 23.51	1.9970	9 25 33.5	14.927	12	3 10 21.54	2.3642	20 28 53.9	12.045
13	1 28 23.49	2.0026	9 40 28.4	14.904	13	3 12 43.67	2.3734	20 40 53.5	11.939
14	1 30 23.82	2.0084	9 55 21.9	14.880	14	3 15 6.35	2.3826	20 52 46.6	11.831
15	1 32 24.50	2.0143	10 10 14.0	14.855	15	3 17 29.58	2.3918	21 4 33.1	11.720
16	1 34 25.53	2.0202	10 25 4.5	14.828	16	3 19 53.37	2.4011	21 16 13.0	11.607
17	1 36 26.93	2.0263	10 39 53.4	14.800	17	3 22 17.71	2.4104	21 27 46.0	11.492
18	1 38 28.69	2.0325	10 54 40.6	14.771	18	3 24 42.61	2.4196	21 39 12.0	11.375
19	1 40 30.82	2.0387	11 9 26.0	14.741	19	3 27 8.07	2.4289	21 50 31.0	11.256
20	1 42 33.33	2.0450	11 24 9.5	14.709	20	3 29 34.08	2.4382	22 1 42.7	11.135
21	1 44 36.22	2.0514	11 38 51.0	14.675	21	3 32 0.65	2.4475	22 12 47.2	11.012
22	1 46 39.50	2.0579	11 53 30.5	14.640	22	3 34 27.78	2.4568	22 23 44.2	10.886
23	1 48 43.18	2.0646	12 8 7.9	14.604	23	3 36 55.46	2.4660	22 34 33.5	10.758
24	1 50 47.26	2.0713	N. 12 22 43.0	14.566	24	3 39 23.70	2.4753	N. 22 45 15.1	10.628

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	THURSDAY 13.					SATURDAY 15.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	3 39 23.70	2.4753	N.22 45 15.1	10.628	0	5 47 34.27	2.8154	N.28 5 58.7	2.045
1	3 41 52.50	2.4846	22 55 48.9	10.496	1	5 50 23.29	2.8184	28 7 54.9	1.830
2	3 44 21.85	2.4938	23 6 14.6	10.362	2	5 53 12.47	2.8211	28 9 38.2	1.613
3	3 46 51.75	2.5030	23 16 32.2	10.225	3	5 56 1.81	2.8236	28 11 8.5	1.396
4	3 49 22.21	2.5122	23 26 41.5	10.086	4	5 58 51.30	2.8258	28 12 25.7	1.179
5	3 51 53.22	2.5214	23 36 42.4	9.945	5	6 1 40.91	2.8278	28 13 29.9	0.961
6	3 54 24.78	2.5305	23 46 34.8	9.801	6	6 4 30.63	2.8296	28 14 21.0	0.743
7	3 56 56.88	2.5396	23 56 18.5	9.655	7	6 7 20.45	2.8311	28 14 59.0	0.524
8	3 59 29.52	2.5487	24 5 53.5	9.508	8	6 10 10.36	2.8324	28 15 23.9	0.305
9	4 2 2.71	2.5576	24 15 19.5	9.358	9	6 13 0.34	2.8334	28 15 35.6	+0.086
10	4 4 36.43	2.5665	24 24 36.4	9.206	10	6 15 50.37	2.8342	28 15 34.1	−0.134
11	4 7 10.69	2.5754	24 33 44.2	9.052	11	6 18 40.44	2.8348	28 15 19.5	0.354
12	4 9 45.48	2.5842	24 42 42.6	8.895	12	6 21 30.54	2.8351	28 14 51.7	0.574
13	4 12 20.79	2.5929	24 51 31.6	8.737	13	6 24 20.65	2.8352	28 14 10.7	0.794
14	4 14 56.63	2.6015	25 0 11.0	8.577	14	6 27 10.76	2.8350	28 13 16.4	1.014
15	4 17 32.98	2.6101	25 8 40.8	8.414	15	6 30 0.85	2.8346	28 12 9.0	1.234
16	4 20 9.85	2.6186	25 17 0.7	8.249	16	6 32 50.91	2.8340	28 10 48.4	1.453
17	4 22 47.22	2.6270	25 25 10.7	8.082	17	6 35 40.92	2.8330	28 9 14.6	1.672
18	4 25 25.09	2.6353	25 33 10.6	7.913	18	6 38 30.87	2.8318	28 7 27.7	1.891
19	4 28 3.46	2.6435	25 41 0.3	7.742	19	6 41 20.75	2.8304	28 5 27.7	2.109
20	4 30 42.32	2.6516	25 48 39.7	7.569	20	6 44 10.53	2.8288	28 3 14.6	2.327
21	4 33 21.66	2.6597	25 56 8.6	7.394	21	6 47 0.20	2.8270	28 0 48.4	2.545
22	4 36 1.48	2.6675	26 3 27.0	7.217	22	6 49 49.76	2.8249	27 58 9.1	2.763
23	4 38 41.76	2.6752	N.26 10 34.8	7.039	23	6 52 39.18	2.8225	N.27 55 16.8	2.980
	FRIDAY 14.					SUNDAY 16.			
0	4 41 22.51	2.6829	N.26 17 31.7	6.859	0	6 55 28.46	2.8199	N.27 52 11.6	3.196
1	4 44 3.71	2.6904	26 24 17.7	6.676	1	6 58 17.58	2.8172	27 48 53.4	3.411
2	4 46 45.36	2.6978	26 30 52.7	6.491	2	7 1 6.53	2.8142	27 45 22.3	3.625
3	4 49 27.44	2.7050	26 37 16.6	6.305	3	7 3 55.29	2.8109	27 41 38.4	3.839
4	4 52 9.95	2.7121	26 43 29.3	6.117	4	7 6 43.84	2.8075	27 37 41.7	4.052
5	4 54 52.88	2.7190	26 49 30.6	5.927	5	7 9 32.18	2.8039	27 33 32.2	4.263
6	4 57 36.22	2.7257	26 55 20.5	5.736	6	7 12 20.29	2.8000	27 29 10.1	4.473
7	5 0 19.96	2.7323	27 0 58.9	5.543	7	7 15 8.17	2.7959	27 24 35.4	4.683
8	5 3 4.10	2.7388	27 6 25.6	5.348	8	7 17 55.79	2.7916	27 19 48.1	4.892
9	5 5 48.62	2.7450	27 11 40.6	5.151	9	7 20 43.15	2.7871	27 14 48.3	5.099
10	5 8 33.50	2.7510	27 16 43.7	4.953	10	7 23 30.23	2.7824	27 9 36.2	5.305
11	5 11 18.74	2.7569	27 21 34.9	4.754	11	7 26 17.03	2.7775	27 4 11.8	5.510
12	5 14 4.33	2.7627	27 26 14.1	4.553	12	7 29 3.53	2.7724	26 58 35.1	5.713
13	5 16 50.26	2.7683	27 30 41.2	4.350	13	7 31 49.72	2.7671	26 52 46.2	5.915
14	5 19 36.51	2.7736	27 34 56.1	4.146	14	7 34 35.58	2.7616	26 46 45.3	6.116
15	5 22 23.08	2.7787	27 38 58.7	3.941	15	7 37 21.11	2.7560	26 40 32.3	6.315
16	5 25 9.95	2.7836	27 42 49.0	3.735	16	7 40 6.30	2.7503	26 34 7.5	6.513
17	5 27 57.11	2.7883	27 46 26.9	3.528	17	7 42 51.14	2.7443	26 27 30.8	6.709
18	5 30 44.55	2.7928	27 49 52.3	3.319	18	7 45 35.62	2.7382	26 20 42.4	6.903
19	5 33 32.26	2.7971	27 53 5.1	3.109	19	7 48 19.72	2.7320	26 13 42.4	7.096
20	5 36 20.22	2.8012	27 56 5.3	2.898	20	7 51 3.45	2.7255	26 6 30.9	7.287
21	5 39 8.41	2.8051	27 58 52.8	2.686	21	7 53 46.79	2.7189	25 59 8.0	7.476
22	5 41 56.82	2.8087	28 1 27.6	2.473	22	7 56 29.73	2.7122	25 51 33.7	7.664
23	5 44 45.44	2.8121	28 3 49.6	2.259	23	7 59 12.26	2.7054	25 43 48.2	7.850
24	5 47 34.27	2.8154	N.28 5 58.7	2.045	24	8 1 54.38	2.6985	N.25 35 51.7	8.034

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	MONDAY 17.					WEDNESDAY 19.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	8 1 54.38	2.6985	N.25 35 51.7	8.034	0	10 2 7.40	2.3057	N.16 17 40.2	14.389
1	8 4 36.07	2.6914	25 27 44.2	8.217	1	10 4 25.51	2.2980	16 3 14.4	14.469
2	8 7 17.34	2.6842	25 19 25.8	8.397	2	10 6 43.16	2.2904	15 48 43.9	14.546
3	8 9 58.17	2.6769	25 10 56.6	8.575	3	10 9 0.35	2.2828	15 34 8.8	14.622
4	8 12 38.56	2.6694	25 2 16.8	8.752	4	10 11 17.09	2.2752	15 19 29.3	14.696
5	8 15 18.50	2.6618	24 53 26.5	8.926	5	10 13 33.38	2.2677	15 4 45.4	14.767
6	8 17 57.98	2.6542	24 44 25.7	9.098	6	10 15 49.22	2.2604	14 49 57.3	14.836
7	8 20 37.00	2.6465	24 35 14.6	9.269	7	10 18 4.62	2.2531	14 35 5.1	14.904
8	8 23 15.56	2.6386	24 25 53.4	9.437	8	10 20 19.59	2.2457	14 20 8.8	14.970
9	8 25 53.64	2.6307	24 16 22.2	9.603	9	10 22 34.12	2.2386	14 5 8.7	15.034
10	8 28 31.24	2.6228	24 6 41.1	9.767	10	10 24 48.23	2.2316	13 50 4.8	15.096
11	8 31 8.36	2.6147	23 56 50.1	9.929	11	10 27 1.91	2.2246	13 34 57.2	15.156
12	8 33 45.00	2.6065	23 46 49.5	10.090	12	10 29 15.18	2.2177	13 19 46.1	15.214
13	8 36 21.15	2.5983	23 36 39.3	10.248	13	10 31 28.03	2.2107	13 4 31.6	15.270
14	8 38 56.80	2.5901	23 26 19.7	10.404	14	10 33 40.48	2.2040	12 49 13.7	15.324
15	8 41 31.96	2.5818	23 15 50.8	10.558	15	10 35 52.53	2.1975	12 33 52.6	15.376
16	8 44 6.62	2.5734	23 5 12.8	10.709	16	10 38 4.18	2.1909	12 18 28.5	15.427
17	8 46 40.78	2.5650	22 54 25.8	10.858	17	10 40 15.44	2.1844	12 3 1.4	15.476
18	8 49 14.43	2.5566	22 43 29.9	11.005	18	10 42 26.31	2.1780	11 47 31.3	15.524
19	8 51 47.57	2.5482	22 32 25.3	11.149	19	10 44 36.80	2.1717	11 31 58.5	15.570
20	8 54 20.21	2.5397	22 21 12.0	11.291	20	10 46 46.92	2.1655	11 16 23.0	15.613
21	8 56 52.34	2.5312	22 9 50.3	11.432	21	10 48 56.67	2.1594	11 0 44.9	15.655
22	8 59 23.95	2.5227	21 58 20.2	11.570	22	10 51 6.05	2.1534	10 45 4.4	15.696
23	9 1 55.05	2.5141	N.21 46 41.9	11.706	23	10 53 15.08	2.1475	N.10 29 21.5	15.735
	TUESDAY 18.					THURSDAY 20.			
0	9 4 25.64	2.5055	N.21 34 55.5	11.840	0	10 55 23.75	2.1417	N.10 13 36.3	15.771
1	9 6 55.71	2.4969	21 23 1.1	11.971	1	10 57 32.07	2.1359	9 57 49.0	15.806
2	9 9 25.27	2.4883	21 10 58.9	12.100	2	10 59 40.06	2.1302	9 41 59.6	15.840
3	9 11 54.32	2.4798	20 58 49.1	12.227	3	11 1 47.71	2.1247	9 26 8.2	15.872
4	9 14 22.85	2.4713	20 46 31.7	12.352	4	11 3 55.03	2.1193	9 10 15.0	15.903
5	9 16 50.86	2.4627	20 34 6.8	12.475	5	11 6 2.02	2.1139	8 54 20.0	15.932
6	9 19 18.36	2.4541	20 21 34.7	12.595	6	11 8 8.69	2.1086	8 38 23.3	15.959
7	9 21 45.35	2.4455	20 8 55.5	12.713	7	11 10 15.05	2.1035	8 22 25.0	15.984
8	9 24 11.83	2.4370	19 56 9.2	12.829	8	11 12 21.11	2.0984	8 6 25.2	16.008
9	9 26 37.79	2.4285	19 43 16.0	12.943	9	11 14 26.86	2.0934	7 50 24.0	16.031
10	9 29 3.25	2.4200	19 30 16.0	13.055	10	11 16 32.32	2.0886	7 34 21.5	16.052
11	9 31 28.20	2.4116	19 17 9.4	13.164	11	11 18 37.49	2.0838	7 18 17.8	16.071
12	9 33 52.64	2.4032	19 3 56.3	13.271	12	11 20 42.38	2.0791	7 2 13.0	16.089
13	9 36 16.58	2.3948	18 50 36.9	13.376	13	11 22 46.99	2.0746	6 46 7.1	16.106
14	9 38 40.01	2.3865	18 37 11.3	13.479	14	11 24 51.33	2.0701	6 30 0.3	16.121
15	9 41 2.95	2.3782	18 23 39.5	13.580	15	11 26 55.40	2.0657	6 13 52.6	16.134
16	9 43 25.39	2.3699	18 10 1.7	13.678	16	11 28 59.21	2.0614	5 57 44.2	16.146
17	9 45 47.34	2.3617	17 56 18.1	13.774	17	11 31 2.77	2.0572	5 41 35.1	16.157
18	9 48 8.79	2.3535	17 42 28.8	13.868	18	11 33 6.08	2.0532	5 25 25.4	16.167
19	9 50 29.76	2.3454	17 28 33.9	13.960	19	11 35 9.15	2.0492	5 9 15.1	16.175
20	9 52 50.25	2.3374	17 14 33.6	14.050	20	11 37 11.98	2.0453	4 53 4.4	16.181
21	9 55 10.25	2.3294	17 0 27.9	14.138	21	11 39 14.58	2.0415	4 36 53.3	16.186
22	9 57 29.77	2.3214	16 46 17.0	14.224	22	11 41 16.96	2.0378	4 20 41.9	16.190
23	9 59 48.82	2.3135	16 32 1.1	14.307	23	11 43 19.12	2.0342	4 4 30.4	16.193
24	10 2 7.40	2.3057	N.16 17 40.2	14.389	24	11 45 21.06	2.0307	N. 3 48 18.8	16.194

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	FRIDAY 21.					SUNDAY 23.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	11 45 21.06	2.0307	N. 3 48 18.8	16.194	0	13 20 35.04	1.9715	S. 8 47 39.6	14.882
1	11 47 22.80	2.0273	3 32 7.1	16.194	1	13 22 33.35	1.9723	9 2 31.0	14.829
2	11 49 24.34	2.0240	3 15 55.5	16.193	2	13 24 31.72	1.9733	9 17 19.1	14.775
3	11 51 25.68	2.0208	2 59 44.0	16.190	3	13 26 30.14	1.9743	9 32 4.0	14.721
4	11 53 26.83	2.0177	2 43 32.7	16.186	4	13 28 28.63	1.9753	9 46 45.6	14.665
5	11 55 27.80	2.0147	2 27 21.7	16.181	5	13 30 27.18	1.9764	10 1 23.8	14.608
6	11 57 28.59	2.0118	2 11 11.0	16.175	6	13 32 25.80	1.9776	10 15 58.6	14.551
7	11 59 29.21	2.0090	1 55 0.7	16.167	7	13 34 24.50	1.9789	10 30 29.9	14.492
8	12 1 29.66	2.0062	1 38 50.9	16.158	8	13 36 23.27	1.9804	10 44 57.6	14.432
9	12 3 29.95	2.0036	1 22 41.7	16.148	9	13 38 22.13	1.9818	10 59 21.7	14.371
10	12 5 30.09	2.0011	1 6 33.2	16.136	10	13 40 21.07	1.9831	11 13 42.1	14.309
11	12 7 30.08	1.9986	0 50 25.4	16.124	11	13 42 20.10	1.9846	11 27 58.8	14.247
12	12 9 29.93	1.9963	0 34 18.4	16.110	12	13 44 19.23	1.9863	11 42 11.8	14.184
13	12 11 29.64	1.9941	0 18 12.3	16.094	13	13 46 18.46	1.9880	11 56 20.9	14.119
14	12 13 29.21	1.9919	N. 0 2 7.1	16.078	14	13 48 17.79	1.9897	12 10 26.1	14.053
15	12 15 28.66	1.9898	S. 0 13 57.1	16.061	15	13 50 17.23	1.9915	12 24 27.4	13.987
16	12 17 27.99	1.9879	0 30 0.3	16.043	16	13 52 16.78	1.9934	12 38 24.6	13.920
17	12 19 27.21	1.9861	0 46 2.3	16.024	17	13 54 16.44	1.9954	12 52 17.8	13.852
18	12 21 26.32	1.9843	1 2 3.0	16.003	18	13 56 16.22	1.9974	13 6 6.9	13.783
19	12 23 25.32	1.9826	1 18 2.5	15.981	19	13 58 16.12	1.9994	13 19 51.8	13.713
20	12 25 24.22	1.9810	1 34 0.7	15.958	20	14 0 16.15	2.0015	13 33 32.4	13.642
21	12 27 23.03	1.9795	1 49 57.5	15.934	21	14 2 16.31	2.0037	13 47 8.8	13.570
22	12 29 21.75	1.9781	2 5 52.8	15.909	22	14 4 16.60	2.0059	14 0 40.8	13.498
23	12 31 20.39	1.9767	S. 2 21 46.5	15.882	23	14 6 17.03	2.0082	S. 14 14 8.4	13.424
	SATURDAY 22.					MONDAY 24.			
0	12 33 18.96	1.9754	S. 2 37 38.6	15.854	0	14 8 17.59	2.0106	S. 14 27 31.6	13.348
1	12 35 17.45	1.9743	2 53 29.0	15.825	1	14 10 18.29	2.0130	14 40 50.2	13.272
2	12 37 15.88	1.9733	3 9 17.6	15.795	2	14 12 19.14	2.0154	14 54 4.3	13.196
3	12 39 14.24	1.9723	3 25 4.4	15.765	3	14 14 20.14	2.0179	15 7 13.8	13.119
4	12 41 12.55	1.9714	3 40 49.4	15.734	4	14 16 21.29	2.0205	15 20 18.6	13.040
5	12 43 10.81	1.9706	3 56 32.4	15.701	5	14 18 22.60	2.0231	15 33 18.6	12.960
6	12 45 9.03	1.9699	4 12 13.4	15.667	6	14 20 24.06	2.0257	15 46 13.9	12.880
7	12 47 7.20	1.9693	4 27 52.4	15.632	7	14 22 25.69	2.0284	15 59 4.3	12.799
8	12 49 5.34	1.9688	4 43 29.3	15.596	8	14 24 27.48	2.0312	16 11 49.8	12.717
9	12 51 3.46	1.9684	4 59 4.0	15.559	9	14 26 29.43	2.0340	16 24 30.4	12.634
10	12 53 1.55	1.9680	5 14 36.4	15.521	10	14 28 31.55	2.0368	16 37 5.9	12.550
11	12 54 59.62	1.9677	5 30 6.5	15.482	11	14 30 33.85	2.0397	16 49 36.4	12.465
12	12 56 57.68	1.9675	5 45 34.2	15.442	12	14 32 36.32	2.0426	17 2 1.7	12.379
13	12 58 55.73	1.9674	6 0 59.5	15.401	13	14 34 38.97	2.0455	17 14 21.8	12.293
14	13 0 53.77	1.9674	6 16 22.3	15.359	14	14 36 41.79	2.0485	17 26 36.7	12.205
15	13 2 51.81	1.9674	6 31 42.5	15.316	15	14 38 44.79	2.0516	17 38 46.4	12.116
16	13 4 49.86	1.9675	6 47 0.1	15.271	16	14 40 47.98	2.0547	17 50 50.8	12.027
17	13 6 47.92	1.9678	7 2 15.0	15.226	17	14 42 51.36	2.0578	18 2 49.7	11.937
18	13 8 46.00	1.9681	7 17 27.2	15.180	18	14 44 54.92	2.0610	18 14 43.1	11.846
19	13 10 44.09	1.9684	7 32 36.6	15.132	19	14 46 58.67	2.0642	18 26 31.1	11.754
20	13 12 42.21	1.9689	7 47 43.2	15.084	20	14 49 2.61	2.0674	18 38 13.6	11.661
21	13 14 40.36	1.9695	8 2 46.8	15.035	21	14 51 6.75	2.0706	18 49 50.4	11.567
22	13 16 38.55	1.9701	8 17 47.5	14.985	22	14 53 11.08	2.0738	19 1 21.5	11.472
23	13 18 36.77	1.9708	8 32 45.1	14.934	23	14 55 15.60	2.0771	19 12 46.9	11.376
24	13 20 35.04	1.9715	S. 8 47 39.6	14.882	24	14 57 20.33	2.0804	S. 19 24 6.6	11.280

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	TUESDAY 25.			
	h m s	s	° ′ ″	″
0	14 57 20.33	2.0804	S.19 24 6.6	11.280
1	14 59 25.25	2.0837	19 35 20.5	11.183
2	15 1 30.37	2.0871	19 46 28.5	11.084
3	15 3 35.70	2.0905	19 57 30.5	10.984
4	15 5 41.23	2.0939	20 8 26.5	10.884
5	15 7 46.97	2.0973	20 19 16.5	10.783
6	15 9 52.91	2.1007	20 30 0.5	10.681
7	15 11 59.05	2.1042	20 40 38.3	10.578
8	15 14 5.40	2.1077	20 51 9.9	10.474
9	15 16 11.97	2.1111	21 1 35.2	10.370
10	15 18 18.75	2.1146	21 11 54.2	10.265
11	15 20 25.73	2.1181	21 22 6.8	10.158
12	15 22 32.92	2.1216	21 32 13.1	10.050
13	15 24 40.32	2.1251	21 42 12.9	9.942
14	15 26 47.93	2.1286	21 52 6.2	9.834
15	15 28 55.75	2.1321	22 1 53.0	9.725
16	15 31 3.78	2.1356	22 11 33.1	9.614
17	15 33 12.03	2.1391	22 21 6.6	9.502
18	15 35 20.48	2.1426	22 30 33.4	9.390
19	15 37 29.14	2.1461	22 39 53.4	9.277
20	15 39 38.01	2.1496	22 49 6.6	9.163
21	15 41 47.09	2.1531	22 58 13.0	9.049
22	15 43 56.38	2.1565	23 7 12.5	8.934
23	15 46 5.88	2.1599	S.23 16 5.0	8.817
	WEDNESDAY 26.			
0	15 48 15.58	2.1634	S.23 24 50.5	8.700
1	15 50 25.49	2.1669	23 33 29.0	8.583
2	15 52 35.60	2.1702	23 42 0.4	8.464
3	15 54 45.91	2.1735	23 50 24.7	8.345
4	15 56 56.42	2.1769	23 58 41.8	8.225
5	15 59 7.14	2.1803	24 6 51.7	8.104
6	16 1 18.06	2.1836	24 14 54.3	7.983
7	16 3 29.17	2.1868	24 22 49.5	7.860
8	16 5 40.47	2.1900	24 30 37.4	7.737
9	16 7 51.97	2.1932	24 38 17.9	7.614
10	16 10 3.67	2.1964	24 45 51.0	7.489
11	16 12 15.55	2.1996	24 53 16.6	7.363
12	16 14 27.62	2.2027	25 0 34.7	7.237
13	16 16 39.87	2.2057	25 7 45.2	7.111
14	16 18 52.31	2.2087	25 14 48.1	6.984
15	16 21 4.93	2.2117	25 21 43.3	6.856
16	16 23 17.73	2.2147	25 28 30.9	6.728
17	16 25 30.70	2.2176	25 35 10.7	6.599
18	16 27 43.84	2.2204	25 41 42.7	6.469
19	16 29 57.16	2.2232	25 48 7.0	6.339
20	16 32 10.64	2.2260	25 54 23.5	6.208
21	16 34 24.28	2.2287	26 0 32.0	6.076
22	16 36 38.08	2.2313	26 6 32.6	5.944
23	16 38 52.04	2.2339	26 12 25.3	5.812
24	16 41 6.15	2.2365	S.26 18 10.1	5.679

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	THURSDAY 27.			
	h m s	s	° ′ ″	″
0	16 41 6.15	2.2365	S.26 18 10.1	5.679
1	16 43 20.41	2.2391	26 23 46.9	5.546
2	16 45 34.82	2.2415	26 29 15.6	5.412
3	16 47 49.37	2.2438	26 34 36.3	5.277
4	16 50 4.06	2.2461	26 39 48.9	5.142
5	16 52 18.88	2.2482	26 44 53.3	5.006
6	16 54 33.83	2.2503	26 49 49.6	4.870
7	16 56 48.91	2.2523	26 54 37.7	4.734
8	16 59 4.11	2.2542	26 59 17.6	4.597
9	17 1 19.42	2.2562	27 3 49.3	4.459
10	17 3 34.85	2.2581	27 8 12.7	4.321
11	17 5 50.39	2.2598	27 12 27.9	4.183
12	17 8 6.04	2.2616	27 16 34.7	4.045
13	17 10 21.77	2.2632	27 20 33.2	3.906
14	17 12 37.61	2.2647	27 24 23.4	3.766
15	17 14 53.54	2.2662	27 28 5.2	3.627
16	17 17 9.56	2.2677	27 31 38.6	3.488
17	17 19 25.66	2.2690	27 35 3.7	3.347
18	17 21 41.83	2.2702	27 38 20.3	3.206
19	17 23 58.07	2.2713	27 41 28.5	3.066
20	17 26 14.38	2.2723	27 44 28.2	2.925
21	17 28 30.75	2.2733	27 47 19.5	2.784
22	17 30 47.18	2.2742	27 50 2.3	2.643
23	17 33 3.66	2.2750	S.27 52 36.6	2.501
	FRIDAY 28.			
0	17 35 20.18	2.2757	S.27 55 2.5	2.360
1	17 37 36.74	2.2763	27 57 19.9	2.219
2	17 39 53.33	2.2768	27 59 28.7	2.077
3	17 42 9.96	2.2772	28 1 29.0	1.935
4	17 44 26.61	2.2776	28 3 20.8	1.793
5	17 46 43.27	2.2779	28 5 4.1	1.651
6	17 48 59.95	2.2780	28 6 38.9	1.509
7	17 51 16.63	2.2781	28 8 5.1	1.366
8	17 53 33.32	2.2781	28 9 22.8	1.223
9	17 55 50.00	2.2779	28 10 31.9	1.081
10	17 58 6.67	2.2777	28 11 32.5	0.939
11	18 0 23.33	2.2774	28 12 24.6	0.797
12	18 2 39.97	2.2770	28 13 8.1	0.655
13	18 4 56.58	2.2765	28 13 43.1	0.513
14	18 7 13.16	2.2759	28 14 9.6	0.371
15	18 9 29.70	2.2753	28 14 27.6	0.229
16	18 11 46.20	2.2746	28 14 37.1	−0.087
17	18 14 2.65	2.2737	28 14 38.0	+0.055
18	18 16 19.04	2.2727	28 14 30.5	0.196
19	18 18 35.38	2.2717	28 14 14.5	0.337
20	18 20 51.65	2.2706	28 13 50.1	0.478
21	18 23 7.85	2.2694	28 13 17.2	0.618
22	18 25 23.97	2.2681	28 12 35.9	0.759
23	18 27 40.01	2.2667	28 11 46.1	0.900
24	18 29 55.97	2.2652	S.28 10 47.9	1.040

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	SATURDAY 29.			
	h m s	s	° ′ ″	″
0	18 29 55.97	2.2652	S. 28 10 47.9	1.040
1	18 32 11.83	2.2636	28 9 41.3	1.179
2	18 34 27.59	2.2619	28 8 26.4	1.318
3	18 36 43.25	2.2601	28 7 3.1	1.457
4	18 38 58.80	2.2583	28 5 31.5	1.596
5	18 41 14.24	2.2564	28 3 51.6	1.734
6	18 43 29.57	2.2544	28 2 3.4	1.872
7	18 45 44.77	2.2523	28 0 6.9	2.010
8	18 47 59.85	2.2502	27 58 2.2	2.147
9	18 50 14.79	2.2478	27 55 49.2	2.284
10	18 52 29.59	2.2455	27 53 28.1	2.420
11	18 54 44.25	2.2431	27 50 58.8	2.557
12	18 56 58.76	2.2406	27 48 21.3	2.693
13	18 59 13.12	2.2380	27 45 35.7	2.827
14	19 1 27.32	2.2353	27 42 42.1	2.961
15	19 3 41.36	2.2326	27 39 40.4	3.095
16	19 5 55.23	2.2298	27 36 30.7	3.228
17	19 8 8.94	2.2270	27 33 13.0	3.361
18	19 10 22.47	2.2239	27 29 47.4	3.493
19	19 12 35.81	2.2209	27 26 13.8	3.625
20	19 14 48.98	2.2179	27 22 32.4	3.756
21	19 17 1.96	2.2147	27 18 43.1	3.887
22	19 19 14.75	2.2115	27 14 45.9	4.017
23	19 21 27.34	2.2082	S. 27 10 41.0	4.146
	SUNDAY 30.			
0	19 23 39.73	2.2048	S. 27 6 28.4	4.274
1	19 25 51.92	2.2014	27 2 8.1	4.403
2	19 28 3.90	2.1979	26 57 40.1	4.531
3	19 30 15.67	2.1944	26 53 4.4	4.658
4	19 32 27.23	2.1908	26 48 21.2	4.783
5	19 34 38.57	2.1872	26 43 30.5	4.908
6	19 36 49.69	2.1835	26 38 32.2	5.033
7	19 39 0.59	2.1798	26 33 26.5	5.157
8	19 41 11.27	2.1760	26 28 13.3	5.281
9	19 43 21.71	2.1722	26 22 52.8	5.403
10	19 45 31.93	2.1683	26 17 25.0	5.524
11	19 47 41.91	2.1643	26 11 49.9	5.646
12	19 49 51.65	2.1603	26 6 7.5	5.767
13	19 52 1.15	2.1563	26 0 17.9	5.886
14	19 54 10.41	2.1523	25 54 21.2	6.004
15	19 56 19.43	2.1482	25 48 17.4	6.122
16	19 58 28.20	2.1441	25 42 6.6	6.239
17	20 0 36.72	2.1399	25 35 48.7	6.356
18	20 2 44.99	2.1357	25 29 23.9	6.472
19	20 4 53.01	2.1315	25 22 52.1	6.587
20	20 7 0.77	2.1273	25 16 13.5	6.701
21	20 9 8.28	2.1230	25 9 28.0	6.814
22	20 11 15.53	2.1187	25 2 35.8	6.927
23	20 13 22.52	2.1143	24 55 36.8	7.038
24	20 15 29.25	2.1100	S. 24 48 31.2	7.148
	MONDAY, JULY 1.			
	h m s	s	° ′ ″	″
0	20 15 29.25	2.1100	S. 24 48 31.2	7.148

PHASES OF THE MOON.

			d	h	m
☾	Last Quarter . .	June	7	14	35.6
●	New Moon		14	18	23.6
☽	First Quarter		21	8	38.9
○	Full Moon		29	1	33.8

			d	h
☾	Apogee	June	4	0.9
☾	Perigee		16	4.5

AT GREENWICH APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S					Sidereal Time of Semidiameter Passing Meridian.	Equation of Time, to be Added to Apparent Time.	Diff. for 1 Hour.
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.	Semidiameter.			
		h m s	s	° ′ ″	″	′ ″	s	m s	s
Mon.	1	6 40 14.96	10.340	N.23 7 48.6	− 9.93	15 45.68	68.76	3 33.61	0.481
Tues.	2	6 44 22.98	10.329	23 3 37.9	10.94	15 45.67	68.72	3 45.03	0.471
Wed.	3	6 48 30.74	10.317	22 59 3.1	11.95	15 45.66	68.68	3 56.20	0.459
Thur.	4	6 52 38.21	10.305	22 54 4.3	−12.95	15 45.66	68.64	4 7.08	0.447
Frid.	5	6 56 45.38	10.292	22 48 41.6	13.94	15 45.66	68.59	4 17.66	0.434
Sat.	6	7 0 52.23	10.278	22 42 55.0	14.93	15 45.67	68.54	4 27.93	0.421
SUN.	7	7 4 58.74	10.264	22 36 44.8	−15.92	15 45.67	68.49	4 37.86	0.407
Mon.	8	7 9 4.91	10.249	22 30 11.1	16.90	15 45.68	68.44	4 47.44	0.392
Tues.	9	7 13 10.71	10.233	22 23 14.0	17.87	15 45.70	68.38	4 56.66	0.376
Wed.	10	7 17 16.12	10.217	22 15 53.5	−18.83	15 45.72	68.32	5 5.48	0.359
Thur.	11	7 21 21.12	10.200	22 8 10.0	19.79	15 45.75	68.26	5 13.90	0.342
Frid.	12	7 25 25.69	10.181	22 0 3.7	20.74	15 45.78	68.20	5 21.89	0.324
Sat.	13	7 29 29.81	10.162	21 51 34.6	−21.68	15 45.82	68.13	5 29.44	0.305
SUN.	14	7 33 33.47	10.142	21 42 43.0	22.61	15 45.87	68.06	5 36.52	0.285
Mon.	15	7 37 36.64	10.122	21 33 29.1	23.53	15 45.92	67.99	5 43.12	0.264
Tues.	16	7 41 39.30	10.100	21 23 53.2	−24.45	15 45.98	67.92	5 49.21	0.243
Wed.	17	7 45 41.44	10.078	21 13 55.3	25.36	15 46.04	67.85	5 54.77	0.221
Thur.	18	7 49 43.04	10.055	21 3 35.9	26.25	15 46.10	67.78	5 59.80	0.198
Frid.	19	7 53 44.09	10.032	20 52 55.2	−27.13	15 46.17	67.70	6 4.28	0.175
Sat.	20	7 57 44.57	10.008	20 41 53.4	28.01	15 46.25	67.63	6 8.19	0.151
SUN.	21	8 1 44.47	9.984	20 30 30.6	28.87	15 46.33	67.55	6 11.52	0.127
Mon.	22	8 5 43.78	9.959	20 18 47.3	−29.72	15 46.42	67.47	6 14.27	0.102
Tues.	23	8 9 42.51	9.934	20 6 43.7	30.57	15 46.51	67.39	6 16.43	0.078
Wed.	24	8 13 40.65	9.909	19 54 20.0	31.41	15 46.60	67.30	6 18.00	0.053
Thur.	25	8 17 38.18	9.884	19 41 36.5	−32.23	15 46.70	67.21	6 18.97	0.028
Frid.	26	8 21 35.10	9.859	19 28 33.4	33.04	15 46.80	67.12	6 19.34	0.003
Sat.	27	8 25 31.42	9.834	19 15 10.9	33.84	15 46.91	67.03	6 19.11	0.022
SUN.	28	8 29 27.14	9.809	19 1 29.5	−34.63	15 47.02	66.95	6 18.28	0.047
Mon.	29	8 33 22.25	9.784	18 47 29.3	35.40	15 47.13	66.86	6 16.84	0.072
Tues.	30	8 37 16.76	9.759	18 33 10.5	36.16	15 47.24	66.78	6 14.80	0.097
Wed.	31	8 41 10.67	9.734	18 18 33.5	36.91	15 47.35	66.70	6 12.16	0.122
Thur.	32	8 45 3.98	9.709	N.18 3 38.6	−37.66	15 47.47	66.62	6 8.92	0.147

NOTE.—The mean time of semidiameter passing may be found by subtracting $0^{s}.19$ from the sidereal time.
The sign − prefixed to the hourly change of declination indicates that north declinations are decreasing.

JULY, 1912.

AT GREENWICH MEAN NOON.

Day of the Week.	Day of the Month.	THE SUN'S				Equation of Time, to be Subtracted from Mean Time.	Diff. for 1 Hour.	Sidereal Time, or Right Ascension of Mean Sun.
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.			
		h m s	s	° ′ ″	″	m s	s	h m s
Mon.	1	6 40 14.36	10.338	N.23 7 49.2	− 9.93	3 33.58	0.481	6 36 40.77
Tues.	2	6 44 22.34	10.328	23 3 38.6	10.94	3 45.00	0.471	6 40 37.33
Wed.	3	6 48 30.06	10.316	22 59 3.9	11.95	3 56.17	0.459	6 44 33.89
Thur.	4	6 52 37.50	10.304	22 54 5.2	−12.95	4 7.05	0.447	6 48 30.45
Frid.	5	6 56 44.64	10.291	22 48 42.6	13.94	4 17.63	0.434	6 52 27.01
Sat.	6	7 0 51.46	10.277	22 42 56.1	14.93	4 27.90	0.421	6 56 23.56
SUN.	7	7 4 57.95	10.263	22 36 46.0	−15.91	4 37.83	0.407	7 0 20.12
Mon.	8	7 9 4.09	10.248	22 30 12.4	16.89	4 47.41	0.392	7 4 16.68
Tues.	9	7 13 9.87	10.232	22 23 15.4	17.86	4 56.63	0.376	7 8 13.24
Wed.	10	7 17 15.25	10.215	22 15 55.1	−18.83	5 5.45	0.359	7 12 9.80
Thur.	11	7 21 20.22	10.198	22 8 11.7	19.79	5 13.87	0.342	7 16 6.36
Frid.	12	7 25 24.77	10.180	22 0 5.5	20.73	5 21.86	0.324	7 20 2.91
Sat.	13	7 29 28.88	10.161	21 51 36.6	−21.67	5 29.41	0.305	7 23 59.47
SUN.	14	7 33 32.52	10.141	21 42 45.1	22.60	5 36.49	0.285	7 27 56.03
Mon.	15	7 37 35.68	10.121	21 33 31.3	23.53	5 43.09	0.264	7 31 52.59
Tues.	16	7 41 38.33	10.099	21 23 55.5	−24.45	5 49.18	0.243	7 35 49.15
Wed.	17	7 45 40.46	10.077	21 13 57.8	25.36	5 54.75	0.221	7 39 45.70
Thur.	18	7 49 42.04	10.054	21 3 38.5	26.25	5 59.78	0.198	7 43 42.26
Frid.	19	7 53 43.07	10.031	20 52 57.9	−27.13	6 4.26	0.175	7 47 38.82
Sat.	20	7 57 43.54	10.007	20 41 56.2	28.01	6 8.17	0.151	7 51 35.38
SUN.	21	8 1 43.44	9.983	20 30 33.6	28.87	6 11.50	0.127	7 55 31.94
Mon.	22	8 5 42.75	9.959	20 18 50.4	−29.72	6 14.25	0.102	7 59 28.49
Tues.	23	8 9 41.47	9.934	20 6 46.9	30.57	6 16.42	0.078	8 3 25.05
Wed.	24	8 13 39.60	9.910	19 54 23.3	31.40	6 18.00	0.053	8 7 21.61
Thur.	25	8 17 37.13	9.885	19 41 39.9	−32.22	6 18.97	0.028	8 11 18.16
Frid.	26	8 21 34.06	9.860	19 28 36.9	33.03	6 19.34	0.003	8 15 14.72
Sat.	27	8 25 30.39	9.834	19 15 14.5	33.83	6 19.11	0.022	8 19 11.28
SUN.	28	8 29 26.12	9.809	19 1 33.1	−34.62	6 18.28	0.047	8 23 7.84
Mon.	29	8 33 21.24	9.784	18 47 33.0	35.39	6 16.85	0.072	8 27 4.39
Tues.	30	8 37 15.76	9.759	18 33 14.3	36.15	6 14.81	0.097	8 31 0.95
Wed.	31	8 41 9.68	9.734	18 18 37.3	36.91	6 12.17	0.122	8 34 57.51
Thur.	32	8 45 3.00	9.709	N.18 3 42.4	−37.66	6 8.94	0.147	8 38 54.06

NOTE.—The semidiameter for mean noon may be assumed the same as that for apparent noon. The sign − prefixed to the hourly change of declination indicates that north declinations are decreasing.

Diff. for 1 Hour, $+9^s.8565$. (Table III.)

AT GREENWICH MEAN NOON.

Day of the Month.	Day of the Year.	THE SUN'S				Logarithm of the Radius Vector of the Earth.	Diff. for 1 Hour.	Mean Tim Sidereal N
		True Longitude.		Diff. for 1 Hour.	Latitude.			
		λ	λ′					
		° ′ ″	′ ″	″	″			h m
1	183	99 14 57.6	14 37.2	142.95	−0.79	0.007 2040	+ 2.4	17 20 2
2	184	100 12 8.3	11 47.8	142.95	0.76	0.007 2089	1.7	17 16 3
3	185	101 9 19.1	8 58.4	142.96	0.69	0.007 2122	1.0	17 12 3
4	186	102 6 30.1	6 9.2	142.96	−0.60	0.007 2139	+ 0.3	17 8 4
5	187	103 3 41.4	3 20.3	142.97	0.50	0.007 2139	− 0.4	17 4 4
6	188	104 0 52.9	0 31.6	142.98	0.38	0.007 2120	1.2	17 0 4
7	189	104 58 4.8	57 43.3	143.00	−0.25	0.007 2082	− 2.0	16 56 5
8	190	105 55 17.0	54 55.4	143.02	−0.12	0.007 2024	2.9	16 52 5
9	191	106 52 29.7	52 7.9	143.04	+0.01	0.007 1945	3.8	16 49
10	192	107 49 42.9	49 20.9	143.06	+0.12	0.007 1843	− 4.8	16 45
11	193	108 46 56.5	46 34.3	143.08	0.21	0.007 1717	5.8	16 41
12	194	109 44 10.6	43 48.2	143.10	0.28	0.007 1566	6.8	16 37 1
13	195	110 41 25.2	41 2.6	143.11	+0.31	0.007 1389	− 7.9	16 33 1
14	196	111 38 40.1	38 17.3	143.13	0.32	0.007 1185	9.0	16 29 2
15	197	112 35 55.4	35 32.4	143.14	0.30	0.007 0954	10.2	16 25 2
16	198	113 33 11.0	32 47.8	143.15	+0.24	0.007 0696	−11.3	16 21 2
17	199	114 30 26.8	30 3.5	143.16	0.15	0.007 0411	12.4	16 17 3
18	200	115 27 42.8	27 19.3	143.17	+0.04	0.007 0102	13.4	16 13 3
19	201	116 24 59.0	24 35.4	143.18	−0.08	0.006 9769	−14.3	16 9 4
20	202	117 22 15.5	21 51.7	143.19	0.21	0.006 9414	15.2	16 5 4
21	203	118 19 32.2	19 8.2	143.20	0.34	0.006 9038	16.1	16 1 5
22	204	119 16 49.2	16 25.0	143.22	−0.46	0.006 8642	−16.9	15 57 5
23	205	120 14 6.5	13 42.2	143.23	0.57	0.006 8229	17.6	15 53 5
24	206	121 11 24.2	10 59.7	143.25	0.66	0.006 7799	18.3	15 50
25	207	122 8 42.3	8 17.6	143.27	−0.72	0.006 7353	−18.9	15 46
26	208	123 6 1.0	5 36.1	143.29	0.76	0.006 6892	19.5	15 42 1
27	209	124 3 20.2	2 55.2	143.32	0.78	0.006 6417	20.1	15 38 1
28	210	125 0 40.1	0 15.0	143.35	−0.76	0.006 5927	−20.7	15 34 1
29	211	125 58 0.8	57 35.5	143.38	0.73	0.006 5424	21.2	15 30 2
30	212	126 55 22.3	54 56.8	143.41	0.66	0.006 4907	21.8	15 26 2
31	213	127 52 44.7	52 19.0	143.45	0.57	0.006 4376	22.4	15 22 3
32	214	128 50 8.0	49 42.2	143.50	−0.47	0.006 3832	−23.0	15 18 3

Note.—The longitudes in the column λ are referred to the true equinox of their own date, while those in the column λ′ are referred to the mean equinox of the beginning of the Besselian fictitious year.

Diff. for 1
$-9^{s}.829$
(Table I

GREENWICH MEAN TIME.

Day of the Month.	THE MOON'S								
	SEMIDIAMETER.		HORIZONTAL PARALLAX.				UPPER TRANSIT.		AGE.
	Noon.	Midnight.	Noon.	Diff. for 1 Hour.	Midnight.	Diff. for 1 Hour.	Meridian of Greenwich.	Diff. for 1 Hour.	Noon.
	′ ″	′ ″	′ ″	″	′ ″	″	h m	m	d
1	14 44.5	14 44.3	54 0.3	−0.14	53 59.4	0.00	14 5.8	1.94	16.2
2	14 44.5	14 45.2	54 0.2	+0.14	54 2.7	+0.28	14 51.1	1.83	17.2
3	14 46.3	14 48.0	54 7.0	0.44	54 13.2	0.60	15 33.9	1.74	18.2
4	14 50.3	14 53.1	54 21.5	+0.78	54 31.9	+0.96	16 14.9	1.68	19.2
5	14 56.5	15 0.6	54 44.4	1.14	54 59.2	1.32	16 55.3	1.68	20.2
6	15 5.2	15 10.4	55 16.2	1.51	55 35.4	1.69	17 36.0	1.72	21.2
7	15 16.2	15 22.6	55 56.8	+1.86	56 20.1	+2.02	18 18.5	1.83	22.2
8	15 29.5	15 36.7	56 45.2	2.15	57 11.8	2.26	19 4.2	1.99	23.2
9	15 44.2	15 52.0	57 39.5	2.34	58 8.0	2.39	19 54.5	2.21	24.2
10	15 59.9	16 7.6	58 36.8	+2.38	59 5.1	+2.32	20 50.7	2.47	25.2
11	16 15.0	16 22.0	59 32.4	2.20	59 58.0	2.03	21 52.8	2.69	26.2
12	16 28.3	16 33.8	60 21.2	1.80	60 41.3	1.51	22 59.1	2.80	27.2
13	16 38.2	16 41.5	60 57.6	+1.18	61 9.6	+0.81	6	. .	28.2
14	16 43.5	16 44.2	61 17.0	+0.41	61 19.5	0.00	0 6.2	2.76	29.2
15	16 43.5	16 41.5	61 17.0	−0.41	61 9.7	−0.80	1 10.4	2.58	1.0
16	16 38.3	16 34.0	60 57.8	−1.16	60 41.9	−1.47	2 9.7	2.35	2.0
17	16 28.7	16 22.6	60 22.5	1.73	60 0.3	1.94	3 3.7	2.15	3.0
18	16 15.9	16 8.9	59 35.9	2.10	59 10.0	2.20	3 53.4	2.01	4.0
19	16 1.6	15 54.3	58 43.3	−2.24	58 16.3	−2.24	4 40.5	1.92	5.0
20	15 47.0	15 39.8	57 49.5	2.20	57 23.4	2.13	5 26.3	1.90	6.0
21	15 33.0	15 26.6	56 58.4	2.03	56 34.7	1.92	6 12.2	1.93	7.0
22	15 20.5	15 14.9	56 12.4	−1.79	55 51.8	−1.64	6 59.3	1.99	8.0
23	15 9.8	15 5.1	55 33.0	1.50	55 15.9	1.35	7 48.1	2.08	9.0
24	15 1.0	14 57.3	55 0.7	1.19	54 47.3	1.05	8 38.9	2.15	10.0
25	14 54.1	14 51.4	54 35.6	−0.91	54 25.5	−0.77	9 30.9	2.18	11.0
26	14 49.1	14 47.2	54 17.1	0.64	54 10.2	0.51	10 23.0	2.16	12.0
27	14 45.7	14 44.6	54 4.8	0.39	54 0.8	0.27	11 14.0	2.09	13.0
28	14 43.9	14 43.6	53 58.3	−0.15	53 57.1	−0.05	12 2.9	1.98	14.0
29	14 43.7	14 44.1	53 57.2	+0.06	53 58.7	+0.18	12 49.0	1.87	15.0
30	14 44.8	14 46.0	54 1.5	0.30	54 5.8	0.42	13 32.6	1.77	16.0
31	14 47.6	14 49.5	54 11.5	0.54	54 18.7	0.66	14 14.0	1.70	17.0
32	14 51.9	14 54.7	54 27.4	+0.80	54 37.8	+0.94	14 54.3	1.67	18.0

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	MONDAY 1.					WEDNESDAY 3.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	20 15 29.25	2.1100	S.24 48 31.2	7.148	0	21 51 43.79	1.9064	S.17 13 56.8	11.464
1	20 17 35.72	2.1057	24 41 19.0	7.258	1	21 53 38.07	1.9029	17 2 26.9	11.533
2	20 19 41.93	2.1013	24 34 0.2	7.368	2	21 55 32.14	1.8993	16 50 52.8	11.602
3	20 21 47.87	2.0968	24 26 34.8	7.477	3	21 57 25.99	1.8958	16 39 14.7	11.669
4	20 23 53.55	2.0924	24 19 3.0	7.583	4	21 59 19.64	1.8924	16 27 32.5	11.737
5	20 25 58.96	2.0880	24 11 24.8	7.690	5	22 1 13.08	1.8890	16 15 46.3	11.803
6	20 28 4.11	2.0836	24 3 40.2	7.796	6	22 3 6.32	1.8857	16 3 56.2	11.868
7	20 30 8.99	2.0791	23 55 49.3	7.900	7	22 4 59.36	1.8824	15 52 2.1	11.933
8	20 32 13.60	2.0746	23 47 52.2	8.004	8	22 6 52.21	1.8792	15 40 4.2	11.997
9	20 34 17.94	2.0702	23 39 48.8	8.108	9	22 8 44.86	1.8760	15 28 2.5	12.060
10	20 36 22.01	2.0657	23 31 39.2	8.211	10	22 10 37.33	1.8729	15 15 57.1	12.122
11	20 38 25.82	2.0612	23 23 23.5	8.312	11	22 12 29.61	1.8698	15 3 47.9	12.183
12	20 40 29.36	2.0567	23 15 1.8	8.412	12	22 14 21.70	1.8667	14 51 35.1	12.243
13	20 42 32.63	2.0522	23 6 34.0	8.512	13	22 16 13.61	1.8637	14 39 18.7	12.303
14	20 44 35.63	2.0477	22 58 0.3	8.611	14	22 18 5.35	1.8608	14 26 58.7	12.363
15	20 46 38.36	2.0432	22 49 20.7	8.709	15	22 19 56.91	1.8580	14 14 35.1	12.422
16	20 48 40.82	2.0388	22 40 35.2	8.807	16	22 21 48.31	1.8552	14 2 8.1	12.479
17	20 50 43.02	2.0344	22 31 43.9	8.903	17	22 23 39.54	1.8524	13 49 37.6	12.535
18	20 52 44.95	2.0299	22 22 46.9	8.998	18	22 25 30.60	1.8497	13 37 3.8	12.592
19	20 54 46.61	2.0254	22 13 44.2	9.093	19	22 27 21.50	1.8471	13 24 26.6	12.647
20	20 56 48.00	2.0210	22 4 35.8	9.187	20	22 29 12.25	1.8446	13 11 46.1	12.702
21	20 58 49.13	2.0166	21 55 21.8	9.279	21	22 31 2.85	1.8421	12 59 2.4	12.756
22	21 0 49.99	2.0122	21 46 2.3	9.371	22	22 32 53.30	1.8396	12 46 15.4	12.809
23	21 2 50.59	2.0078	S.21 36 37.3	9.462	23	22 34 43.60	1.8371	S.12 33 25.3	12.862
	TUESDAY 2.					THURSDAY 4.			
0	21 4 50.93	2.0035	S.21 27 6.8	9.552	0	22 36 33.76	1.8348	S.12 20 32.0	12.913
1	21 6 51.01	1.9991	21 17 31.0	9.642	1	22 38 23.78	1.8326	12 7 35.7	12.964
2	21 8 50.82	1.9947	21 7 49.8	9.731	2	22 40 13.67	1.8304	11 54 36.3	13.015
3	21 10 50.37	1.9903	20 58 3.3	9.818	3	22 42 3.43	1.8283	11 41 33.9	13.064
4	21 12 49.66	1.9861	20 48 11.6	9.904	4	22 43 53.06	1.8262	11 28 28.6	13.113
5	21 14 48.70	1.9818	20 38 14.8	9.990	5	22 45 42.57	1.8242	11 15 20.4	13.161
6	21 16 47.48	1.9776	20 28 12.8	10.076	6	22 47 31.96	1.8222	11 2 9.3	13.208
7	21 18 46.01	1.9733	20 18 5.7	10.160	7	22 49 21.24	1.8203	10 48 55.4	13.255
8	21 20 44.28	1.9691	20 7 53.6	10.243	8	22 51 10.40	1.8185	10 35 38.7	13.302
9	21 22 42.30	1.9649	19 57 36.5	10.327	9	22 52 59.46	1.8168	10 22 19.2	13.348
10	21 24 40.07	1.9608	19 47 14.4	10.408	10	22 54 48.41	1.8151	10 8 57.0	13.392
11	21 26 37.59	1.9667	19 36 47.5	10.488	11	22 56 37.27	1.8135	9 55 32.2	13.435
12	21 28 34.87	1.9526	19 26 15.8	10.568	12	22 58 26.03	1.8119	9 42 4.8	13.478
13	21 30 31.90	1.9485	19 15 39.3	10.647	13	23 0 14.70	1.8105	9 28 34.9	13.520
14	21 32 28.69	1.9446	19 4 58.1	10.726	14	23 2 3.29	1.8091	9 15 2.4	13.562
15	21 34 25.25	1.9406	18 54 12.2	10.803	15	23 3 51.79	1.8078	9 1 27.4	13.603
16	21 36 21.56	1.9366	18 43 21.7	10.880	16	23 5 40.22	1.8065	8 47 50.0	13.643
17	21 38 17.64	1.9327	18 32 26.6	10.957	17	23 7 28.57	1.8053	8 34 10.2	13.683
18	21 40 13.49	1.9288	18 21 26.9	11.032	18	23 9 16.85	1.8042	8 20 28.0	13.722
19	21 42 9.10	1.9250	18 10 22.8	11.105	19	23 11 5.07	1.8031	8 6 43.5	13.760
20	21 44 4.49	1.9212	17 59 14.3	11.178	20	23 12 53.22	1.8021	7 52 56.8	13.798
21	21 45 59.65	1.9174	17 48 1.4	11.252	21	23 14 41.32	1.8012	7 39 7.8	13.835
22	21 47 54.58	1.9137	17 36 44.1	11.323	22	23 16 29.36	1.8003	7 25 16.6	13.871
23	21 49 49.30	1.9101	17 25 22.6	11.394	23	23 18 17.36	1.7996	7 11 23.3	13.906
24	21 51 43.79	1.9064	S.17 13 56.8	11.464	24	23 20 5.31	1.7989	S. 6 57 27.9	13.941

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	FRIDAY 5.					SUNDAY 7.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	23 20 5.31	1.7989	S. 6 57 27.9	13.941	0	0 47 8.22	1.8602	N. 4 38 14.5	14.759
1	23 21 53.23	1.7983	6 43 30.4	13.975	1	0 48 59.93	1.8636	4 53 0.0	14.757
2	23 23 41.11	1.7977	6 29 30.9	14.008	2	0 50 51.85	1.8671	5 7 45.3	14.753
3	23 25 28.96	1.7972	6 15 29.4	14.042	3	0 52 43.98	1.8707	5 22 30.3	14.748
4	23 27 16.78	1.7968	6 1 25.9	14.074	4	0 54 36.33	1.8743	5 37 15.1	14.744
5	23 29 4.58	1.7966	5 47 20.6	14.104	5	0 56 28.90	1.8781	5 51 59.6	14.738
6	23 30 52.37	1.7963	5 33 13.4	14.135	6	0 58 21.70	1.8819	6 6 43.6	14.730
7	23 32 40.14	1.7962	5 19 4.4	14.164	7	1 0 14.73	1.8858	6 21 27.2	14.722
8	23 34 27.91	1.7961	5 4 53.7	14.193	8	1 2 8.00	1.8898	6 36 10.3	14.713
9	23 36 15.67	1.7961	4 50 41.2	14.222	9	1 4 1.51	1.8940	6 50 52.8	14.703
10	23 38 3.44	1.7962	4 36 27.0	14.251	10	1 5 55.28	1.8983	7 5 34.7	14.692
11	23 39 51.21	1.7963	4 22 11.1	14.277	11	1 7 49.30	1.9026	7 20 15.9	14.681
12	23 41 38.99	1.7965	4 7 53.7	14.303	12	1 9 43.59	1.9070	7 34 56.4	14.668
13	23 43 26.79	1.7968	3 53 34.7	14.330	13	1 11 38.14	1.9115	7 49 36.1	14.653
14	23 45 14.61	1.7972	3 39 14.1	14.355	14	1 13 32.97	1.9162	8 4 14.9	14.638
15	23 47 2.46	1.7977	3 24 52.1	14.378	15	1 15 28.08	1.9208	8 18 52.7	14.623
16	23 48 50.33	1.7982	3 10 28.7	14.402	16	1 17 23.47	1.9256	8 33 29.5	14.606
17	23 50 38.24	1.7988	2 56 3.8	14.426	17	1 19 19.15	1.9305	8 48 5.3	14.587
18	23 52 26.19	1.7996	2 41 37.6	14.447	18	1 21 15.13	1.9355	9 2 39.9	14.568
19	23 54 14.19	1.8003	2 27 10.1	14.468	19	1 23 11.41	1.9406	9 17 13.4	14.548
20	23 56 2.23	1.8012	2 12 41.4	14.489	20	1 25 8.00	1.9458	9 31 45.6	14.526
21	23 57 50.33	1.8022	1 58 11.4	14.510	21	1 27 4.90	1.9510	9 46 16.5	14.503
22	23 59 38.49	1.8032	1 43 40.2	14.529	22	1 29 2.12	1.9563	10 0 45.9	14.478
23	0 1 26.71	1.8043	S. 1 29 7.9	14.547	23	1 30 59.66	1.9618	N. 10 15 13.9	14.454
	SATURDAY 6.					MONDAY 8.			
0	0 3 15.01	1.8056	S. 1 14 34.5	14.565	0	1 32 57.54	1.9674	N. 10 29 40.4	14.428
1	0 5 3.38	1.8068	1 0 0.1	14.582	1	1 34 55.75	1.9731	10 44 5.3	14.401
2	0 6 51.83	1.8082	0 45 24.6	14.599	2	1 36 54.31	1.9788	10 58 28.5	14.372
3	0 8 40.36	1.8096	0 30 48.2	14.614	3	1 38 53.21	1.9846	11 12 49.9	14.342
4	0 10 28.98	1.8111	0 16 10.9	14.628	4	1 40 52.46	1.9906	11 27 9.5	14.311
5	0 12 17.69	1.8128	S. 0 1 32.8	14.643	5	1 42 52.08	1.9967	11 41 27.2	14.278
6	0 14 6.51	1.8145	N. 0 13 6.2	14.657	6	1 44 52.06	2.0028	11 55 42.9	14.245
7	0 15 55.43	1.8163	0 27 46.0	14.669	7	1 46 52.41	2.0089	12 9 56.6	14.210
8	0 17 44.46	1.8182	0 42 26.5	14.681	8	1 48 53.13	2.0152	12 24 8.1	14.174
9	0 19 33.61	1.8202	0 57 7.7	14.692	9	1 50 54.24	2.0217	12 38 17.5	14.137
10	0 21 22.88	1.8222	1 11 49.5	14.702	10	1 52 55.73	2.0282	12 52 24.5	14.098
11	0 23 12.27	1.8243	1 26 31.9	14.711	11	1 54 57.62	2.0348	13 6 29.2	14.058
12	0 25 1.79	1.8265	1 41 14.8	14.719	12	1 56 59.91	2.0415	13 20 31.4	14.016
13	0 26 51.45	1.8288	1 55 58.2	14.727	13	1 59 2.60	2.0483	13 34 31.1	13.973
14	0 28 41.25	1.8313	2 10 42.1	14.735	14	2 1 5.70	2.0551	13 48 28.1	13.928
15	0 30 31.20	1.8338	2 25 26.4	14.741	15	2 3 9.21	2.0621	14 2 22.4	13.883
16	0 32 21.30	1.8363	2 40 11.0	14.746	16	2 5 13.15	2.0692	14 16 14.0	13.836
17	0 34 11.56	1.8390	2 54 55.9	14.751	17	2 7 17.51	2.0763	14 30 2.7	13.787
18	0 36 1.98	1.8418	3 9 41.1	14.755	18	2 9 22.30	2.0835	14 43 48.4	13.737
19	0 37 52.57	1.8446	3 24 26.5	14.757	19	2 11 27.53	2.0908	14 57 31.1	13.685
20	0 39 43.33	1.8475	3 39 12.0	14.759	20	2 13 33.20	2.0982	15 11 10.6	13.632
21	0 41 34.27	1.8505	3 53 57.6	14.761	21	2 15 39.31	2.1057	15 24 46.9	13.577
22	0 43 25.39	1.8537	4 8 43.3	14.761	22	2 17 45.88	2.1133	15 38 19.8	13.521
23	0 45 16.71	1.8569	4 23 28.9	14.760	23	2 19 52.91	2.1210	15 51 49.4	13.463
24	0 47 8.22	1.8602	N. 4 38 14.5	14.759	24	2 22 0.40	2.1288	N. 16 5 15.4	13.403

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
			TUESDAY 9.					THURSDAY 11.	
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	2 22 0.40	2.1288	N.16 5 15.4	13.403	0	4 14 19.27	2.5636	N.25 5 50.9	8.358
1	2 24 8.36	2.1366	16 18 37.8	13.342	1	4 16 53.36	2.5728	25 14 7.8	8.202
2	2 26 16.79	2.1444	16 31 56.5	13.279	2	4 19 28.00	2.5819	25 22 15.2	8.044
3	2 28 25.69	2.1524	16 45 11.4	13.215	3	4 22 3.19	2.5910	25 30 13.1	7.884
4	2 30 35.08	2.1605	16 58 22.4	13.150	4	4 24 38.92	2.6000	25 38 1.3	7.722
5	2 32 44.95	2.1687	17 11 29.3	13.082	5	4 27 15.19	2.6088	25 45 39.8	7.558
6	2 34 55.32	2.1770	17 24 32.1	13.013	6	4 29 51.98	2.6176	25 53 8.3	7.392
7	2 37 6.19	2.1853	17 37 30.7	12.942	7	4 32 29.30	2.6263	26 0 26.8	7.224
8	2 39 17.56	2.1937	17 50 25.1	12.869	8	4 35 7.14	2.6349	26 7 35.2	7.054
9	2 41 29.43	2.2021	18 3 15.1	12.795	9	4 37 45.49	2.6434	26 14 33.3	6.882
10	2 43 41.81	2.2107	18 16 0.5	12.718	10	4 40 24.35	2.6519	26 21 21.0	6.707
11	2 45 54.71	2.2193	18 28 41.3	12.640	11	4 43 3.72	2.6602	26 27 58.2	6.531
12	2 48 8.12	2.2279	18 41 17.3	12.560	12	4 45 43.58	2.6684	26 34 24.7	6.353
13	2 50 22.06	2.2367	18 53 48.5	12.478	13	4 48 23.93	2.6765	26 40 40.5	6.173
14	2 52 36.52	2.2454	19 6 14.7	12.395	14	4 51 4.76	2.6845	26 46 45.5	5.991
15	2 54 51.51	2.2542	19 18 35.8	12.309	15	4 53 46.07	2.6923	26 52 39.4	5.807
16	2 57 7.03	2.2632	19 30 51.8	12.222	16	4 56 27.84	2.7000	26 58 22.3	5.622
17	2 59 23.09	2.2722	19 43 2.5	12.133	17	4 59 10.07	2.7075	27 3 54.0	5.433
18	3 1 39.70	2.2812	19 55 7.8	12.042	18	5 1 52.74	2.7148	27 9 14.3	5.243
19	3 3 56.85	2.2903	20 7 7.5	11.948	19	5 4 35.85	2.7222	27 14 23.2	5.052
20	3 6 14.54	2.2994	20 19 1.6	11.853	20	5 7 19.40	2.7293	27 19 20.6	4.860
21	3 8 32.78	2.3087	20 30 49.9	11.757	21	5 10 3.37	2.7363	27 24 6.4	4.666
22	3 10 51.58	2.3179	20 42 32.4	11.658	22	5 12 47.75	2.7430	27 28 40.5	4.469
23	3 13 10.93	2.3272	N.20 54 8.9	11.558	23	5 15 32.53	2.7496	N.27 33 2.7	4.271
			WEDNESDAY 10.					FRIDAY 12.	
0	3 15 30.84	2.3365	N.21 5 39.3	11.454	0	5 18 17.70	2.7561	N.27 37 13.0	4.072
1	3 17 51.31	2.3458	21 17 3.4	11.349	1	5 21 3.26	2.7623	27 41 11.3	3.871
2	3 20 12.34	2.3552	21 28 21.2	11.243	2	5 23 49.18	2.7683	27 44 57.5	3.668
3	3 22 33.94	2.3647	21 39 32.5	11.133	3	5 26 35.46	2.7742	27 48 31.4	3.463
4	3 24 56.11	2.3742	21 50 37.2	11.022	4	5 29 22.08	2.7798	27 51 53.1	3.258
5	3 27 18.84	2.3837	22 1 35.2	10.909	5	5 32 9.04	2.7853	27 55 2.4	3.052
6	3 29 42.14	2.3931	22 12 26.3	10.794	6	5 34 56.32	2.7907	27 57 59.3	2.844
7	3 32 6.01	2.4026	22 23 10.5	10.677	7	5 37 43.92	2.7957	28 0 43.7	2.635
8	3 34 30.45	2.4122	22 33 47.5	10.557	8	5 40 31.81	2.8005	28 3 15.5	2.424
9	3 36 55.47	2.4218	22 44 17.3	10.436	9	5 43 19.98	2.8052	28 5 34.6	2.212
10	3 39 21.06	2.4313	22 54 39.8	10.313	10	5 46 8.43	2.8097	28 7 40.9	1.999
11	3 41 47.22	2.4408	23 4 54.8	10.187	11	5 48 57.14	2.8138	28 9 34.5	1.786
12	3 44 13.96	2.4504	23 15 2.2	10.059	12	5 51 46.09	2.8178	28 11 15.2	1.570
13	3 46 41.27	2.4600	23 25 1.9	9.929	13	5 54 35.28	2.8217	28 12 42.9	1.354
14	3 49 9.15	2.4695	23 34 53.7	9.797	14	5 57 24.69	2.8252	28 13 57.7	1.138
15	3 51 37.61	2.4790	23 44 37.5	9.663	15	6 0 14.30	2.8284	28 14 59.5	0.920
16	3 54 6.64	2.4886	23 54 13.2	9.526	16	6 3 4.10	2.8315	28 15 48.1	0.701
17	3 56 36.24	2.4981	24 3 40.6	9.388	17	6 5 54.08	2.8343	28 16 23.6	0.482
18	3 59 6.41	2.5076	24 12 59.7	9.247	18	6 8 44.22	2.8368	28 16 46.0	0.263
19	4 1 37.15	2.5170	24 22 10.2	9.103	19	6 11 34.50	2.8392	28 16 55.2	+0.043
20	4 4 8.45	2.5263	24 31 12.1	8.959	20	6 14 24.92	2.8413	28 16 51.2	−0.178
21	4 6 40.31	2.5358	24 40 5.3	8.813	21	6 17 15.46	2.8432	28 16 33.9	0.399
22	4 9 12.74	2.5452	24 48 49.6	8.663	22	6 20 6.10	2.8448	28 16 3.3	0.621
23	4 11 45.73	2.5544	24 57 24.8	8.511	23	6 22 56.83	2.8462	28 15 19.4	0.843
24	4 14 19.27	2.5636	N.25 5 50.9	8.358	24	6 25 47.64	2.8473	N.28 14 22.2	1.066

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	SATURDAY 13.					MONDAY 15.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	6 25 47.64	2.8473	N.28 14 22.2	1.066	0	8 39 24.46	2.6473	N.23 17 31.3	10.823
1	6 28 38.51	2.8482	28 13 11.6	1.288	1	8 42 3.06	2.6393	23 6 37.0	10.987
2	6 31 29.43	2.8488	28 11 47.7	1.510	2	8 44 41.18	2.6313	22 55 32.9	11.147
3	6 34 20.37	2.8491	28 10 10.4	1.733	3	8 47 18.82	2.6233	22 44 19.3	11.306
4	6 37 11.32	2.8492	28 8 19.7	1.956	4	8 49 55.98	2.6152	22 32 56.2	11.463
5	6 40 2.28	2.8492	28 6 15.7	2.178	5	8 52 32.65	2.6071	22 21 23.8	11.617
6	6 42 53.23	2.8488	28 3 58.4	2.400	6	8 55 8.83	2.5989	22 9 42.2	11.768
7	6 45 44.14	2.8482	28 1 27.7	2.622	7	8 57 44.52	2.5907	21 57 51.7	11.917
8	6 48 35.01	2.8473	27 58 43.7	2.844	8	9 0 19.71	2.5823	21 45 52.2	12.064
9	6 51 25.82	2.8463	27 55 46.4	3.066	9	9 2 54.40	2.5741	21 33 44.0	12.209
10	6 54 16.56	2.8450	27 52 35.8	3.287	10	9 5 28.60	2.5657	21 21 27.1	12.352
11	6 57 7.22	2.8434	27 49 12.0	3.508	11	9 8 2.29	2.5573	21 9 1.8	12.491
12	6 59 57.77	2.8416	27 45 34.9	3.728	12	9 10 35.48	2.5489	20 56 28.2	12.628
13	7 2 48.21	2.8395	27 41 44.6	3.948	13	9 13 8.16	2.5405	20 43 46.4	12.763
14	7 5 38.51	2.8372	27 37 41.1	4.167	14	9 15 40.34	2.5322	20 30 56.6	12.896
15	7 8 28.67	2.8347	27 33 24.5	4.385	15	9 18 12.02	2.5238	20 17 58.9	13.026
16	7 11 18.67	2.8319	27 28 54.9	4.602	16	9 20 43.19	2.5153	20 4 53.5	13.153
17	7 14 8.50	2.8289	27 24 12.2	4.819	17	9 23 13.85	2.5068	19 51 40.5	13.279
18	7 16 58.14	2.8257	27 19 16.6	5.035	18	9 25 44.00	2.4983	19 38 20.0	13.402
19	7 19 47.59	2.8223	27 14 8.0	5.250	19	9 28 13.65	2.4900	19 24 52.2	13.523
20	7 22 36.82	2.8187	27 8 46.6	5.463	20	9 30 42.80	2.4816	19 11 17.2	13.641
21	7 25 25.83	2.8148	27 3 12.4	5.676	21	9 33 11.44	2.4731	18 57 35.2	13.757
22	7 28 14.60	2.8108	26 57 25.5	5.888	22	9 35 39.57	2.4648	18 43 46.4	13.870
23	7 31 3.13	2.8066	N.26 51 25.9	6.098	23	9 38 7.21	2.4564	N.18 29 50.8	13.981
	SUNDAY 14.					TUESDAY 16.			
0	7 33 51.39	2.8021	N.26 45 13.8	6.307	0	9 40 34.34	2.4480	N.18 15 48.6	14.090
1	7 36 39.38	2.7974	26 38 49.1	6.515	1	9 43 0.97	2.4398	18 1 40.0	14.196
2	7 39 27.08	2.7925	26 32 12.0	6.721	2	9 45 27.11	2.4315	17 47 25.1	14.300
3	7 42 14.48	2.7875	26 25 22.6	6.926	3	9 47 52.75	2.4233	17 33 4.0	14.402
4	7 45 1.58	2.7823	26 18 20.9	7.130	4	9 50 17.90	2.4150	17 18 36.9	14.500
5	7 47 48.36	2.7769	26 11 7.0	7.332	5	9 52 42.55	2.4068	17 4 4.0	14.597
6	7 50 34.81	2.7714	26 3 41.1	7.532	6	9 55 6.72	2.3987	16 49 25.3	14.692
7	7 53 20.93	2.7657	25 56 3.2	7.731	7	9 57 30.40	2.3907	16 34 41.0	14.783
8	7 56 6.69	2.7598	25 48 13.4	7.928	8	9 59 53.60	2.3827	16 19 51.3	14.872
9	7 58 52.10	2.7538	25 40 11.8	8.123	9	10 2 16.32	2.3747	16 4 56.3	14.960
10	8 1 37.14	2.7475	25 31 58.6	8.317	10	10 4 38.56	2.3668	15 49 56.1	15.045
11	8 4 21.80	2.7411	25 23 33.8	8.509	11	10 7 0.33	2.3589	15 34 50.9	15.128
12	8 7 6.07	2.7346	25 14 57.5	8.699	12	10 9 21.63	2.3511	15 19 40.8	15.208
13	8 9 49.95	2.7279	25 6 9.9	8.886	13	10 11 42.46	2.3433	15 4 25.9	15.286
14	8 12 33.42	2.7211	24 57 11.0	9.073	14	10 14 2.83	2.3357	14 49 6.5	15.362
15	8 15 16.48	2.7142	24 48 1.1	9.258	15	10 16 22.74	2.3281	14 33 42.5	15.436
16	8 17 59.13	2.7072	24 38 40.1	9.440	16	10 18 42.20	2.3206	14 18 14.2	15.507
17	8 20 41.35	2.7001	24 29 8.3	9.620	17	10 21 1.21	2.3131	14 2 41.6	15.576
18	8 23 23.14	2.6928	24 19 25.7	9.798	18	10 23 19.77	2.3057	13 47 5.0	15.643
19	8 26 4.49	2.6854	24 9 32.5	9.975	19	10 25 37.89	2.2983	13 31 24.4	15.708
20	8 28 45.39	2.6780	23 59 28.7	10.149	20	10 27 55.57	2.2911	13 15 40.0	15.771
21	8 31 25.85	2.6705	23 49 14.6	10.320	21	10 30 12.82	2.2839	12 59 51.9	15.831
22	8 34 5.85	2.6628	23 38 50.3	10.490	22	10 32 29.64	2.2768	12 44 0.3	15.889
23	8 36 45.39	2.6551	23 28 15.8	10.658	23	10 34 46.03	2.2698	12 28 5.2	15.946
24	8 39 24.46	2.6473	N.23 17 31.3	10.823	24	10 37 2.01	2.2628	N.12 12 6.8	16.000

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	WEDNESDAY 17.					FRIDAY 19.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	10 37 2.01	2.2628	N. 12 12 6.8	16.000	0	12 19 23.67	2.0390	S. 1 2 32.6	16.475
1	10 39 17.57	2.2560	11 56 5.2	16.052	1	12 21 25.94	2.0368	1 19 0.3	16.448
2	10 41 32.73	2.2493	11 40 0.6	16.102	2	12 23 28.08	2.0346	1 35 26.3	16.419
3	10 43 47.48	2.2426	11 23 53.0	16.150	3	12 25 30.09	2.0324	1 51 50.6	16.389
4	10 46 1.84	2.2360	11 7 42.6	16.196	4	12 27 31.97	2.0303	2 8 13.0	16.358
5	10 48 15.80	2.2294	10 51 29.5	16.239	5	12 29 33.73	2.0284	2 24 33.6	16.327
6	10 50 29.37	2.2230	10 35 13.9	16.281	6	12 31 35.38	2.0266	2 40 52.2	16.293
7	10 52 42.56	2.2167	10 18 55.8	16.321	7	12 33 36.92	2.0248	2 57 8.7	16.258
8	10 54 55.37	2.2104	10 2 35.4	16.358	8	12 35 38.36	2.0232	3 13 23.1	16.222
9	10 57 7.81	2.2043	9 46 12.8	16.394	9	12 37 39.71	2.0217	3 29 35.3	16.185
10	10 59 19.88	2.1982	9 29 48.1	16.428	10	12 39 40.97	2.0202	3 45 45.3	16.147
11	11 1 31.59	2.1923	9 13 21.4	16.461	11	12 41 42.14	2.0188	4 1 52.9	16.107
12	11 3 42.95	2.1864	8 56 52.8	16.491	12	12 43 43.23	2.0175	4 17 58.2	16.067
13	11 5 53.96	2.1806	8 40 22.5	16.519	13	12 45 44.24	2.0163	4 34 1.0	16.025
14	11 8 4.62	2.1748	8 23 50.5	16.546	14	12 47 45.18	2.0152	4 50 1.2	15.982
15	11 10 14.94	2.1692	8 7 17.0	16.570	15	12 49 46.06	2.0142	5 5 58.9	15.939
16	11 12 24.93	2.1638	7 50 42.1	16.593	16	12 51 46.88	2.0132	5 21 53.9	15.893
17	11 14 34.60	2.1584	7 34 5.8	16.615	17	12 53 47.65	2.0123	5 37 46.1	15.847
18	11 16 43.94	2.1531	7 17 28.3	16.634	18	12 55 48.36	2.0115	5 53 35.6	15.801
19	11 18 52.97	2.1479	7 0 49.7	16.652	19	12 57 49.03	2.0108	6 9 22.2	15.753
20	11 21 1.69	2.1428	6 44 10.1	16.667	20	12 59 49.66	2.0103	6 25 5.9	15.703
21	11 23 10.10	2.1377	6 27 29.6	16.681	21	13 1 50.26	2.0098	6 40 46.6	15.653
22	11 25 18.21	2.1328	6 10 48.4	16.693	22	13 3 50.83	2.0093	6 56 24.3	15.602
23	11 27 26.03	2.1280	N. 5 54 6.4	16.705	23	13 5 51.37	2.0089	S. 7 11 58.8	15.549
	THURSDAY 18.					SATURDAY 20.			
0	11 29 33.57	2.1233	N. 5 37 23.8	16.714	0	13 7 51.90	2.0087	S. 7 27 30.2	15.496
1	11 31 40.83	2.1187	5 20 40.7	16.721	1	13 9 52.41	2.0085	7 42 58.3	15.441
2	11 33 47.81	2.1141	5 3 57.2	16.727	2	13 11 52.92	2.0084	7 58 23.1	15.385
3	11 35 54.52	2.1097	4 47 13.5	16.731	3	13 13 53.42	2.0083	8 13 44.5	15.328
4	11 38 0.97	2.1053	4 30 29.6	16.733	4	13 15 53.92	2.0083	8 29 2.5	15.272
5	11 40 7.16	2.1011	4 13 45.5	16.735	5	13 17 54.42	2.0084	8 44 17.1	15.213
6	11 42 13.10	2.0969	3 57 1.4	16.734	6	13 19 54.93	2.0087	8 59 28.1	15.153
7	11 44 18.79	2.0928	3 40 17.4	16.732	7	13 21 55.46	2.0090	9 14 35.5	15.093
8	11 46 24.24	2.0889	3 23 33.6	16.728	8	13 23 56.01	2.0093	9 29 39.2	15.031
9	11 48 29.46	2.0851	3 6 50.0	16.723	9	13 25 56.58	2.0098	9 44 39.2	14.969
10	11 50 34.45	2.0813	2 50 6.8	16.717	10	13 27 57.18	2.0103	9 59 35.5	14.906
11	11 52 39.22	2.0777	2 33 24.0	16.708	11	13 29 57.82	2.0109	10 14 27.9	14.841
12	11 54 43.77	2.0741	2 16 41.8	16.698	12	13 31 58.49	2.0115	10 29 16.4	14.776
13	11 56 48.11	2.0707	2 0 0.2	16.687	13	13 33 59.20	2.0123	10 44 1.0	14.709
14	11 58 52.25	2.0673	1 43 19.3	16.675	14	13 35 59.96	2.0131	10 58 41.5	14.642
15	12 0 56.19	2.0641	1 26 39.2	16.661	15	13 38 0.77	2.0139	11 13 18.0	14.574
16	12 2 59.94	2.0609	1 10 0.0	16.646	16	13 40 1.63	2.0148	11 27 50.4	14.505
17	12 5 3.50	2.0578	0 53 21.7	16.630	17	13 42 2.55	2.0158	11 42 18.6	14.435
18	12 7 6.88	2.0548	0 36 44.4	16.611	18	13 44 3.53	2.0169	11 56 42.6	14.364
19	12 9 10.08	2.0519	0 20 8.3	16.592	19	13 46 4.58	2.0181	12 11 2.3	14.292
20	12 11 13.11	2.0492	N. 0 3 33.4	16.571	20	13 48 5.70	2.0193	12 25 17.7	14.219
21	12 13 15.98	2.0466	S. 0 13 0.2	16.549	21	13 50 6.89	2.0205	12 39 28.6	14.145
22	12 15 18.70	2.0440	0 29 32.5	16.526	22	13 52 8.16	2.0219	12 53 35.1	14.071
23	12 17 21.26	2.0414	0 46 3.3	16.501	23	13 54 9.52	2.0233	13 7 37.1	13.996
24	12 19 23.67	2.0390	S. 1 2 32.6	16.475	24	13 56 10.96	2.0248	S. 13 21 34.6	13.920

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	SUNDAY 21.					TUESDAY 23.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	13 56 10.96	2.0248	S.13 21 34.6	13.920	0	15 35 59.82	2.1470	S.22 45 36.5	9.271
1	13 58 12.49	2.0263	13 35 27.5	13.842	1	15 38 8.73	2.1501	22 54 49.3	9.156
2	14 0 14.12	2.0279	13 49 15.7	13.763	2	15 40 17.83	2.1532	23 3 55.2	9.040
3	14 2 15.84	2.0295	14 2 59.1	13.684	3	15 42 27.11	2.1562	23 12 54.1	8.923
4	14 4 17.66	2.0312	14 16 37.8	13.605	4	15 44 36.57	2.1593	23 21 45.9	8.804
5	14 6 19.59	2.0330	14 30 11.7	13.525	5	15 46 46.22	2.1623	23 30 30.6	8.685
6	14 8 21.62	2.0348	14 43 40.8	13.443	6	15 48 56.05	2.1653	23 39 8.1	8.566
7	14 10 23.77	2.0368	14 57 4.9	13.360	7	15 51 6.06	2.1684	23 47 38.5	8.446
8	14 12 26.04	2.0387	15 10 24.0	13.277	8	15 53 16.26	2.1714	23 56 1.6	8.325
9	14 14 28.42	2.0407	15 23 38.1	13.193	9	15 55 26.63	2.1744	24 4 17.5	8.204
10	14 16 30.92	2.0427	15 36 47.1	13.108	10	15 57 37.19	2.1774	24 12 26.1	8.082
11	14 18 33.55	2.0448	15 49 51.0	13.022	11	15 59 47.92	2.1803	24 20 27.3	7.958
12	14 20 36.30	2.0469	16 2 49.7	12.935	12	16 1 58.83	2.1833	24 28 21.1	7.835
13	14 22 39.18	2.0492	16 15 43.2	12.847	13	16 4 9.91	2.1862	24 36 7.5	7.712
14	14 24 42.20	2.0514	16 28 31.4	12.758	14	16 6 21.17	2.1891	24 43 46.5	7.588
15	14 26 45.35	2.0537	16 41 14.2	12.669	15	16 8 32.60	2.1919	24 51 18.0	7.462
16	14 28 48.64	2.0560	16 53 51.7	12.579	16	16 10 44.20	2.1948	24 58 41.9	7.336
17	14 30 52.07	2.0584	17 6 23.7	12.488	17	16 12 55.97	2.1976	25 5 58.3	7.210
18	14 32 55.65	2.0608	17 18 50.3	12.397	18	16 15 7.91	2.2003	25 13 7.1	7.083
19	14 34 59.37	2.0633	17 31 11.3	12.303	19	16 17 20.01	2.2031	25 20 8.2	6.955
20	14 37 3.24	2.0658	17 43 26.7	12.210	20	16 19 32.28	2.2058	25 27 1.7	6.827
21	14 39 7.26	2.0683	17 55 36.5	12.116	21	16 21 44.70	2.2084	25 33 47.5	6.698
22	14 41 11.44	2.0710	18 7 40.6	12.021	22	16 23 57.29	2.2111	25 40 25.5	6.569
23	14 43 15.78	2.0736	S.18 19 39.0	11.925	23	16 26 10.03	2.2137	S.25 46 55.8	6.439
	MONDAY 22.					WEDNESDAY 24.			
0	14 45 20.27	2.0762	S.18 31 31.6	11.828	0	16 28 22.93	2.2163	S.25 53 18.2	6.308
1	14 47 24.92	2.0789	18 43 18.4	11.731	1	16 30 35.98	2.2188	25 59 32.8	6.178
2	14 49 29.74	2.0817	18 54 59.3	11.632	2	16 32 49.18	2.2212	26 5 39.6	6.047
3	14 51 34.72	2.0843	19 6 34.2	11.533	3	16 35 2.52	2.2236	26 11 38.5	5.915
4	14 53 39.86	2.0871	19 18 3.2	11.433	4	16 37 16.01	2.2260	26 17 29.4	5.782
5	14 55 45.17	2.0900	19 29 26.2	11.332	5	16 39 29.64	2.2283	26 23 12.3	5.649
6	14 57 50.66	2.0929	19 40 43.1	11.231	6	16 41 43.40	2.2305	26 28 47.3	5.516
7	14 59 56.32	2.0958	19 51 53.9	11.128	7	16 43 57.30	2.2327	26 34 14.3	5.383
8	15 2 2.15	2.0986	20 2 58.5	11.025	8	16 46 11.33	2.2348	26 39 33.3	5.249
9	15 4 8.15	2.1015	20 13 56.9	10.922	9	16 48 25.48	2.2369	26 44 44.2	5.113
10	15 6 14.33	2.1044	20 24 49.1	10.817	10	16 50 39.76	2.2390	26 49 46.9	4.978
11	15 8 20.69	2.1074	20 35 34.9	10.711	11	16 52 54.16	2.2410	26 54 41.6	4.843
12	15 10 27.22	2.1104	20 46 14.4	10.605	12	16 55 8.68	2.2429	26 59 28.1	4.707
13	15 12 33.93	2.1133	20 56 47.5	10.498	13	16 57 23.31	2.2448	27 4 6.4	4.571
14	15 14 40.82	2.1164	21 7 14.2	10.391	14	16 59 38.05	2.2466	27 8 36.6	4.434
15	15 16 47.90	2.1195	21 17 34.4	10.282	15	17 1 52.90	2.2483	27 12 58.6	4.298
16	15 18 55.16	2.1225	21 27 48.0	10.173	16	17 4 7.85	2.2499	27 17 12.4	4.161
17	15 21 2.60	2.1255	21 37 55.1	10.063	17	17 6 22.89	2.2515	27 21 17.9	4.023
18	15 23 10.22	2.1285	21 47 55.5	9.952	18	17 8 38.03	2.2531	27 25 15.1	3.884
19	15 25 18.02	2.1316	21 57 49.3	9.840	19	17 10 53.26	2.2546	27 29 4.0	3.746
20	15 27 26.01	2.1347	22 7 36.3	9.727	20	17 13 8.58	2.2559	27 32 44.6	3.607
21	15 29 34.19	2.1378	22 17 16.6	9.615	21	17 15 23.97	2.2572	27 36 16.9	3.468
22	15 31 42.55	2.1408	22 26 50.1	9.502	22	17 17 39.44	2.2584	27 39 40.9	3.330
23	15 33 51.09	2.1439	22 36 16.8	9.387	23	17 19 54.98	2.2596	27 42 56.5	3.191
24	15 35 59.82	2.1470	S.22 45 36.5	9.271	24	17 22 10.59	2.2607	S.27 46 3.8	3.052

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	THURSDAY 25.					SATURDAY 27.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	17 22 10.59	2.2607	S.27 46 3.8	3.052	0	19 10 22.77	2.2159	S.27 31 16.5	3.601
1	17 24 26.26	2.2617	27 49 2.7	2.912	1	19 12 35.64	2.2130	27 27 36.5	3.732
2	17 26 41.99	2.2626	27 51 53.2	2.772	2	19 14 48.33	2.2101	27 23 48.7	3.862
3	17 28 57.77	2.2634	27 54 35.3	2.632	3	19 17 0.85	2.2071	27 19 53.0	3.992
4	17 31 13.60	2.2642	27 57 9.0	2.491	4	19 19 13.18	2.2040	27 15 49.6	4.122
5	17 33 29.48	2.2650	27 59 34.2	2.350	5	19 21 25.33	2.2009	27 11 38.4	4.251
6	17 35 45.40	2.2656	28 1 51.0	2.210	6	19 23 37.29	2.1977	27 7 19.5	4.379
7	17 38 1.35	2.2661	28 3 59.4	2.070	7	19 25 49.05	2.1944	27 2 52.9	4.507
8	17 40 17.33	2.2666	28 5 59.4	1.929	8	19 28 0.62	2.1911	26 58 18.7	4.633
9	17 42 33.34	2.2670	28 7 50.9	1.788	9	19 30 11.98	2.1877	26 53 36.9	4.760
10	17 44 49.37	2.2673	28 9 33.9	1.647	10	19 32 23.14	2.1843	26 48 47.5	4.886
11	17 47 5.42	2.2675	28 11 8.5	1.506	11	19 34 34.10	2.1809	26 43 50.6	5.011
12	17 49 21.47	2.2675	28 12 34.6	1.364	12	19 36 44.85	2.1773	26 38 46.2	5.135
13	17 51 37.52	2.2676	28 13 52.2	1.223	13	19 38 55.38	2.1738	26 33 34.4	5.259
14	17 53 53.58	2.2676	28 15 1.4	1.083	14	19 41 5.70	2.1702	26 28 15.1	5.382
15	17 56 9.63	2.2674	28 16 2.1	0.942	15	19 43 15.80	2.1665	26 22 48.5	5.505
16	17 58 25.67	2.2672	28 16 54.4	0.800	16	19 45 25.68	2.1627	26 17 14.5	5.627
17	18 0 41.70	2.2669	28 17 38.2	0.659	17	19 47 35.33	2.1589	26 11 33.3	5.748
18	18 2 57.70	2.2665	28 18 13.5	0.518	18	19 49 44.75	2.1552	26 5 44.8	5.868
19	18 5 13.68	2.2660	28 18 40.4	0.377	19	19 51 53.95	2.1513	25 59 49.2	5.987
20	18 7 29.62	2.2654	28 18 58.8	0.237	20	19 54 2.91	2.1474	25 53 46.4	6.106
21	18 9 45.53	2.2647	28 19 8.8	−0.097	21	19 56 11.64	2.1435	25 47 36.5	6.224
22	18 12 1.39	2.2640	28 19 10.4	+0.044	22	19 58 20.13	2.1395	25 41 19.5	6.342
23	18 14 17.21	2.2632	S.28 19 3.5	0.185	23	20 0 28.38	2.1355	S.25 34 55.5	6.458
	FRIDAY 26.					SUNDAY 28.			
0	18 16 32.98	2.2623	S.28 18 48.2	0.325	0	20 2 36.39	2.1315	S.25 28 24.6	6.573
1	18 18 48.69	2.2613	28 18 24.5	0.465	1	20 4 44.16	2.1274	25 21 46.7	6.688
2	18 21 4.34	2.2602	28 17 52.4	0.605	2	20 6 51.68	2.1233	25 15 2.0	6.803
3	18 23 19.92	2.2590	28 17 11.9	0.744	3	20 8 58.96	2.1192	25 8 10.4	6.916
4	18 25 35.42	2.2578	28 16 23.1	0.883	4	20 11 5.99	2.1150	25 1 12.1	7.028
5	18 27 50.85	2.2565	28 15 25.9	1.023	5	20 13 12.77	2.1108	24 54 7.0	7.140
6	18 30 6.20	2.2551	28 14 20.3	1.162	6	20 15 19.29	2.1066	24 46 55.3	7.251
7	18 32 21.46	2.2536	28 13 6.5	1.300	7	20 17 25.56	2.1024	24 39 36.9	7.362
8	18 34 36.63	2.2520	28 11 44.3	1.439	8	20 19 31.58	2.0982	24 32 11.9	7.471
9	18 36 51.70	2.2503	28 10 13.8	1.577	9	20 21 37.35	2.0940	24 24 40.4	7.579
10	18 39 6.66	2.2485	28 8 35.0	1.715	10	20 23 42.86	2.0897	24 17 2.4	7.687
11	18 41 21.52	2.2467	28 6 48.0	1.852	11	20 25 48.11	2.0853	24 9 17.9	7.794
12	18 43 36.27	2.2448	28 4 52.8	1.989	12	20 27 53.10	2.0810	24 1 27.1	7.899
13	18 45 50.90	2.2428	28 2 49.3	2.126	13	20 29 57.83	2.0767	23 53 30.0	8.005
14	18 48 5.41	2.2408	28 0 37.7	2.262	14	20 32 2.31	2.0724	23 45 26.5	8.110
15	18 50 19.79	2.2386	27 58 17.9	2.397	15	20 34 6.53	2.0681	23 37 16.8	8.213
16	18 52 34.04	2.2363	27 55 50.0	2.533	16	20 36 10.48	2.0637	23 29 0.9	8.316
17	18 54 48.15	2.2340	27 53 13.9	2.669	17	20 38 14.17	2.0593	23 20 38.9	8.417
18	18 57 2.12	2.2317	27 50 29.7	2.803	18	20 40 17.60	2.0550	23 12 10.8	8.518
19	18 59 15.95	2.2293	27 47 37.5	2.937	19	20 42 20.77	2.0507	23 3 36.6	8.619
20	19 1 29.63	2.2267	27 44 37.2	3.071	20	20 44 23.68	2.0463	22 54 56.5	8.718
21	19 3 43.15	2.2241	27 41 29.0	3.203	21	20 46 26.33	2.0419	22 46 10.5	8.816
22	19 5 56.52	2.2215	27 38 12.8	3.337	22	20 48 28.71	2.0376	22 37 18.6	8.914
23	19 8 9.73	2.2188	27 34 48.6	3.469	23	20 50 30.83	2.0332	22 28 20.8	9.011
24	19 10 22.77	2.2159	S.27 31 16.5	3.601	24	20 52 32.69	2.0288	S.22 19 17.3	9.106

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

MONDAY 29.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	h m s	s	° ′ ″	″
0	20 52 32.69	2.0288	S.22 19 17.3	9.106
1	20 54 34.29	2.0244	22 10 8.1	9.201
2	20 56 35.62	2.0201	22 0 53.2	9.295
3	20 58 36.70	2.0158	21 51 32.7	9.388
4	21 0 37.52	2.0115	21 42 6.6	9.481
5	21 2 38.08	2.0072	21 32 35.0	9.573
6	21 4 38.38	2.0028	21 22 57.9	9.663
7	21 6 38.42	1.9985	21 13 15.5	9.752
8	21 8 38.20	1.9942	21 3 27.7	9.841
9	21 10 37.73	1.9900	20 53 34.6	9.929
10	21 12 37.00	1.9858	20 43 36.2	10.016
11	21 14 36.02	1.9815	20 33 32.7	10.102
12	21 16 34.78	1.9773	20 23 24.0	10.187
13	21 18 33.29	1.9732	20 13 10.2	10.272
14	21 20 31.56	1.9690	20 2 51.4	10.355
15	21 22 29.57	1.9648	19 52 27.6	10.437
16	21 24 27.34	1.9607	19 41 58.9	10.519
17	21 26 24.86	1.9567	19 31 25.3	10.601
18	21 28 22.14	1.9526	19 20 46.8	10.681
19	21 30 19.17	1.9485	19 10 3.6	10.759
20	21 32 15.96	1.9446	18 59 15.7	10.838
21	21 34 12.52	1.9406	18 48 23.1	10.916
22	21 36 8.83	1.9366	18 37 25.8	10.992
23	21 38 4.91	1.9327	S.18 26 24.0	11.067

TUESDAY 30.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
0	21 40 0.76	1.9288	S.18 15 17.7	11.142
1	21 41 56.37	1.9250	18 4 6.9	11.216
2	21 43 51.76	1.9212	17 52 51.7	11.289
3	21 45 46.92	1.9174	17 41 32.2	11.361
4	21 47 41.85	1.9137	17 30 8.3	11.433
5	21 49 36.56	1.9100	17 18 40.2	11.503
6	21 51 31.05	1.9063	17 7 7.9	11.573
7	21 53 25.32	1.9027	16 55 31.4	11.642
8	21 55 19.37	1.8991	16 43 50.8	11.710
9	21 57 13.21	1.8956	16 32 6.2	11.777
10	21 59 6.84	1.8921	16 20 17.5	11.844
11	22 1 0.26	1.8887	16 8 24.9	11.909
12	22 2 53.48	1.8852	15 56 28.4	11.973
13	22 4 46.49	1.8818	15 44 28.1	12.037
14	22 6 39.30	1.8786	15 32 23.9	12.101
15	22 8 31.92	1.8753	15 20 16.0	12.163
16	22 10 24.34	1.8721	15 8 4.4	12.223
17	22 12 16.57	1.8689	14 55 49.2	12.283
18	22 14 8.61	1.8658	14 43 30.4	12.343
19	22 16 0.47	1.8627	14 31 8.0	12.402
20	22 17 52.14	1.8597	14 18 42.1	12.461
21	22 19 43.63	1.8567	14 6 12.7	12.518
22	22 21 34.94	1.8538	13 53 39.9	12.574
23	22 23 26.08	1.8509	13 41 3.8	12.629
24	22 25 17.05	1.8481	S.13 28 24.4	12.684

WEDNESDAY 31.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	h m s	s	° ′ ″	″
0	22 25 17.05	1.8481	S.13 28 24.4	12.684
1	22 27 7.85	1.8453	13 15 41.7	12.738
2	22 28 58.49	1.8427	13 2 55.8	12.792
3	22 30 48.97	1.8400	12 50 6.7	12.844
4	22 32 39.29	1.8374	12 37 14.5	12.895
5	22 34 29.46	1.8349	12 24 19.3	12.946
6	22 36 19.48	1.8324	12 11 21.0	12.996
7	22 38 9.35	1.8300	11 58 19.8	13.045
8	22 39 59.08	1.8276	11 45 15.6	13.093
9	22 41 48.66	1.8253	11 32 8.6	13.141
10	22 43 38.11	1.8230	11 18 58.7	13.188
11	22 45 27.42	1.8208	11 5 46.0	13.234
12	22 47 16.61	1.8187	10 52 30.6	13.279
13	22 49 5.67	1.8166	10 39 12.5	13.323
14	22 50 54.60	1.8146	10 25 51.8	13.367
15	22 52 43.42	1.8127	10 12 28.4	13.411
16	22 54 32.12	1.8108	9 59 2.5	13.453
17	22 56 20.71	1.8090	9 45 34.1	13.494
18	22 58 9.20	1.8072	9 32 3.2	13.535
19	22 59 57.58	1.8055	9 18 29.9	13.574
20	23 1 45.86	1.8038	9 4 54.3	13.613
21	23 3 34.04	1.8022	8 51 16.3	13.652
22	23 5 22.13	1.8007	8 37 36.1	13.689
23	23 7 10.13	1.7993	S. 8 23 53.6	13.727

THURSDAY, AUGUST 1.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
0	23 8 58.05	1.7980	S. 8 10 8.9	13.763

PHASES OF THE MOON.

			d	h	m
☾	Last Quarter . .	July	7	4	46.9
●	New Moon		14	1	13.2
☽	First Quarter		20	17	18.4
○	Full Moon		28	16	28.2

			d	h
☾	Apogee	July	1	12.6
☾	Perigee		14	12.0
☾	Apogee		28	16.8

AT GREENWICH APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S					Sidereal Time of Semidiameter Passing Meridian.	Equation of Time, to be Added to Subtracted from Apparent Time.	Diff. for 1 Hour.
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.	Semidiameter.			
		h m s	s	° ′ ″	″	′ ″	s	m s	s
Thur.	1	8 45 3.98	9.709	N. 18 3 38.6	−37.66	15 47.47	66.62	6 8.92	0.147
Frid.	2	8 48 56.70	9.684	17 48 25.9	38.39	15 47.59	66.53	6 5.09	0.172
Sat.	3	8 52 48.82	9.659	17 32 55.8	39.11	15 47.72	66.45	6 0.68	0.197
SUN.	4	8 56 40.36	9.635	17 17 8.5	−39.82	15 47.85	66.36	5 55.67	0.221
Mon.	5	9 0 31.32	9.611	17 1 4.3	40.52	15 47.98	66.27	5 50.08	0.245
Tues.	6	9 4 21.70	9.587	16 44 43.5	41.21	15 48.11	66.18	5 43.91	0.269
Wed.	7	9 8 11.50	9.563	16 28 6.4	−41.88	15 48.25	66.09	5 37.16	0.293
Thur.	8	9 12 0.72	9.539	16 11 13.2	42.54	15 48.40	66.01	5 29.85	0.317
Frid.	9	9 15 49.37	9.515	15 54 4.3	43.19	15 48.54	65.92	5 21.97	0.341
Sat.	10	9 19 37.45	9.492	15 36 40.0	−43.83	15 48.69	65.84	5 13.52	0.364
SUN.	11	9 23 24.97	9.469	15 19 0.5	44.45	15 48.85	65.75	5 4.51	0.387
Mon.	12	9 27 11.93	9.445	15 1 6.3	45.06	15 49.01	65.67	4 54.94	0.410
Tues.	13	9 30 58.34	9.422	14 42 57.7	−45.65	15 49.18	65.59	4 44.82	0.433
Wed.	14	9 34 44.19	9.399	14 24 35.0	46.23	15 49.36	65.51	4 34.14	0.456
Thur.	15	9 38 29.48	9.376	14 5 58.5	46.79	15 49.54	65.43	4 22.91	0.479
Frid.	16	9 42 14.22	9.353	13 47 8.6	−47.34	15 49.72	65.36	4 11.13	0.502
Sat.	17	9 45 58.43	9.331	13 28 5.6	47.89	15 49.91	65.28	3 58.81	0.524
SUN.	18	9 49 42.11	9.309	13 8 50.0	48.42	15 50.10	65.21	3 45.97	0.546
Mon.	19	9 53 25.27	9.288	12 49 21.9	−48.93	15 50.29	65.14	3 32.62	0.567
Tues.	20	9 57 7.93	9.267	12 29 41.8	49.42	15 50.49	65.07	3 18.76	0.588
Wed.	21	10 0 50.09	9.247	12 9 49.8	49.90	15 50.69	65.00	3 4.40	0.608
Thur.	22	10 4 31.77	9.227	11 49 46.4	−50.37	15 50.89	64.94	2 49.56	0.628
Frid.	23	10 8 12.98	9.208	11 29 31.9	50.83	15 51.10	64.87	2 34.26	0.647
Sat.	24	10 11 53.74	9.190	11 9 6.6	51.28	15 51.31	64.81	2 18.51	0.665
SUN.	25	10 15 34.07	9.172	10 48 30.8	−51.71	15 51.52	64.75	2 2.33	0.683
Mon.	26	10 19 13.99	9.155	10 27 44.8	52.12	15 51.74	64.69	1 45.74	0.700
Tues.	27	10 22 53.51	9.139	10 6 48.8	52.53	15 51.95	64.63	1 28.75	0.716
Wed.	28	10 26 32.64	9.123	9 45 43.2	−52.93	15 52.17	64.57	1 11.38	0.731
Thur.	29	10 30 11.41	9.108	9 24 28.3	53.31	15 52.38	64.52	0 53.64	0.746
Frid.	30	10 33 49.84	9.094	9 3 4.4	53.68	15 52.60	64.47	0 35.56	0.760
Sat.	31	10 37 27.95	9.081	8 41 31.7	54.04	15 52.82	64.42	0 17.16	0.773
SUN.	32	10 41 5.75	9.069	N. 8 19 50.7	−54.39	15 53.05	64.38	0 1.54	0.785

NOTE.—The mean time of semidiameter passing may be found by subtracting 0s.18 from the sidereal time.
The sign − prefixed to the hourly change of declination indicates that north declinations are decreasing.

AT GREENWICH MEAN NOON.

Day of the Week.	Day of the Month.	THE SUN'S				Equation of Time, to be Subtracted from	Diff. for 1 Hour.	Sidereal Time, or Right Ascension of Mean Sun.
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.	Added to Mean Time.		
		h m s	s	° ′ ″	″	m s	s	h m s
Thur.	1	8 45 3.00	9.709	N. 18 3 42.4	−37.66	6 8.94	0.147	8 38 54.06
Frid.	2	8 48 55.73	9.684	17 48 29.8	38.39	6 5.11	0.172	8 42 50.62
Sat.	3	8 52 47.87	9.660	17 32 59.7	39.11	6 0.70	0.197	8 46 47.18
SUN.	4	8 56 39.42	9.636	17 17 12.4	−39.82	5 55.69	0.221	8 50 43.73
Mon.	5	9 0 30.39	9.612	17 1 8.2	40.52	5 50.10	0.245	8 54 40.29
Tues.	6	9 4 20.78	9.588	16 44 47.4	41.21	5 43.93	0.269	8 58 36.84
Wed.	7	9 8 10.59	9.564	16 28 10.3	−41.88	5 37.19	0.293	9 2 33.40
Thur.	8	9 11 59.84	9.540	16 11 17.1	42.54	5 29.88	0.317	9 6 29.96
Frid.	9	9 15 48.51	9.516	15 54 8.1	43.19	5 22.00	0.341	9 10 26.52
Sat.	10	9 19 36.62	9.493	15 36 43.8	−43.83	5 13.55	0.364	9 14 23.07
SUN.	11	9 23 24.17	9.470	15 19 4.3	44.46	5 4.54	0.387	9 18 19.63
Mon.	12	9 27 11.16	9.446	15 1 10.0	45.07	4 54.97	0.410	9 22 16.18
Tues.	13	9 30 57.59	9.423	14 43 1.3	−45.66	4 44.85	0.433	9 26 12.74
Wed.	14	9 34 43.46	9.400	14 24 38.5	46.24	4 34.17	0.456	9 30 9.29
Thur.	15	9 38 28.78	9.377	14 6 1.9	46.80	4 22.94	0.479	9 34 5.85
Frid.	16	9 42 13.56	9.354	13 47 11.9	−47.35	4 11.16	0.502	9 38 2.40
Sat.	17	9 45 57.81	9.332	13 28 8.8	47.89	3 58.85	0.524	9 41 58.96
SUN.	18	9 49 41.53	9.310	13 8 53.0	48.42	3 46.01	0.546	9 45 55.52
Mon.	19	9 53 24.73	9.289	12 49 24.8	−48.93	3 32.65	0.567	9 49 52.07
Tues.	20	9 57 7.42	9.268	12 29 44.5	49.42	3 18.79	0.588	9 53 48.63
Wed.	21	10 0 49.62	9.248	12 9 52.4	49.90	3 4.43	0.608	9 57 45.18
Thur.	22	10 4 31.34	9.229	11 49 48.8	−50.38	2 49.59	0.628	10 1 41.74
Frid.	23	10 8 12.59	9.210	11 29 34.1	50.84	2 34.29	0.647	10 5 38.29
Sat.	24	10 11 53.39	9.191	11 9 8.6	51.29	2 18.54	0.665	10 9 34.85
SUN.	25	10 15 33.76	9.173	10 48 32.6	−51.72	2 2.36	0.683	10 13 31.40
Mon.	26	10 19 13.72	9.156	10 27 46.3	52.14	1 45.76	0.700	10 17 27.96
Tues.	27	10 22 53.28	9.140	10 6 50.1	52.55	1 28.76	0.716	10 21 24.51
Wed.	28	10 26 32.46	9.125	9 45 44.3	−52.94	1 11.39	0.731	10 25 21.06
Thur.	29	10 30 11.27	9.110	9 24 29.1	53.32	0 53.65	0.746	10 29 17.62
Frid.	30	10 33 49.75	9.096	9 3 4.9	53.69	0 35.57	0.760	10 33 14.17
Sat.	31	10 37 27.90	9.083	8 41 32.0	54.04	0 17.17	0.773	10 37 10.73
SUN.	32	10 41 5.75	9.071	N. 8 19 50.7	−54.39	0 1.54	0.785	10 41 7.28

Note.—The semidiameter for mean noon may be assumed the same as that for apparent noon. The sign − prefixed to the hourly change of declination indicates that north declinations are decreasing.

Diff. for 1 Hour,
+9^{s}.8565.
(Table III.)

AT GREENWICH MEAN NOON.

Day of the Month.	Day of the Year.	THE SUN'S				Logarithm of the Radius Vector of the Earth.	Diff. for 1 Hour.	Mean Time of Sidereal Noon.
		True Longitude.		Diff. for 1 Hour.	Latitude.			
		λ	λ'					
		° ′ ″	′ ″	″	″			h m s
1	214	128 50 8.0	49 42.2	143.50	−0.47	0.006 3832	−23.0	15 18 35.04
2	215	129 47 32.4	47 6.4	143.54	0.35	0.006 3274	23.6	15 14 39.12
3	216	130 44 57.9	44 31.8	143.59	0.22	0.006 2702	24.2	15 10 43.21
4	217	131 42 24.6	41 58.4	143.64	−0.09	0.006 2114	−24.8	15 6 47.30
5	218	132 39 52.6	39 26.2	143.69	+0.04	0.006 1510	25.5	15 2 51.39
6	219	133 37 21.9	36 55.3	143.74	0.16	0.006 0889	26.2	14 58 55.48
7	220	134 34 52.5	34 25.8	143.80	+0.25	0.006 0251	−27.0	14 54 59.57
8	221	135 32 24.5	31 57.6	143.86	0.33	0.005 9593	27.8	14 51 3.66
9	222	136 29 57.8	29 30.8	143.92	0.37	0.005 8915	28.7	14 47 7.75
10	223	137 27 32.5	27 5.3	143.98	+0.39	0.005 8215	−29.6	14 43 11.84
11	224	138 25 8.6	24 41.2	144.03	0.37	0.005 7493	30.6	14 39 15.93
12	225	139 22 45.9	22 18.4	144.08	0.32	0.005 6747	31.6	14 35 20.02
13	226	140 20 24.4	19 56.8	144.13	+0.24	0.005 5978	−32.5	14 31 24.11
14	227	141 18 4.1	17 36.4	144.18	0.13	0.005 5186	33.5	14 27 28.20
15	228	142 15 45.0	15 17.2	144.23	+0.01	0.005 4371	34.4	14 23 32.29
16	229	143 13 27.0	12 59.0	144.27	−0.12	0.005 3536	−35.2	14 19 36.38
17	230	144 11 10.1	10 41.9	144.32	0.25	0.005 2680	36.0	14 15 40.47
18	231	145 8 54.2	8 25.9	144.36	0.37	0.005 1806	36.7	14 11 44.56
19	232	146 6 39.4	6 10.9	144.41	−0.47	0.005 0915	−37.4	14 7 48.66
20	233	147 4 25.7	3 57.1	144.45	0.56	0.005 0009	38.0	14 3 52.75
21	234	148 2 13.1	1 44.4	144.50	0.64	0.004 9090	38.6	13 59 56.84
22	235	148 60 1.7	59 32.9	144.55	−0.68	0.004 8158	−39.1	13 56 0.93
23	236	149 57 51.6	57 22.6	144.60	0.70	0.004 7215	39.5	13 52 5.02
24	237	150 55 42.8	55 13.6	144.66	0.69	0.004 6262	39.9	13 48 9.11
25	238	151 53 35.3	53 6.0	144.72	−0.65	0.004 5299	−40.3	13 44 13.20
26	239	152 51 29.2	50 59.8	144.78	0.59	0.004 4327	40.7	13 40 17.29
27	240	153 49 24.6	48 55.1	144.84	0.51	0.004 3347	41.0	13 36 21.38
28	241	154 47 21.5	46 51.9	144.91	−0.40	0.004 2359	−41.3	13 32 25.48
29	242	155 45 20.1	44 50.4	144.98	0.28	0.004 1364	41.6	13 28 29.57
30	243	156 43 20.4	42 50.5	145.05	0.16	0.004 0361	41.9	13 24 33.66
31	244	157 41 22.4	40 52.4	145.12	−0.03	0.003 9351	42.2	13 20 37.75
32	245	158 39 26.3	38 56.2	145.20	+0.11	0.003 8334	−42.6	13 16 41.84

Note.—The longitudes in the column λ are referred to the true equinox of their own date, while those in the column λ' are referred to the mean equinox of the beginning of the Besselian fictitious year.

Diff. for 1 Hour,
$-9^{s}.8296$.
(Table II.)

GREENWICH MEAN TIME.

Day of the Month.	THE MOON'S								
	SEMIDIAMETER.		HORIZONTAL PARALLAX.				UPPER TRANSIT.		AGE.
	Noon.	Midnight.	Noon.	Diff. for 1 Hour.	Midnight.	Diff. for 1 Hour.	Meridian of Greenwich.	Diff. for 1 Hour.	Noon.
	′ ″	′ ″	′ ″	″	′ ″	″	h m	m	d
1	14 51.9	14 54.7	54 27.4	+0.80	54 37.8	+0.94	14 54.3	1.67	18.0
2	14 58.0	15 1.8	54 49.9	1.08	55 3.7	1.22	15 34.4	1.68	19.0
3	15 6.1	15 10.8	55 19.3	1.37	55 36.7	1.52	16 15.5	1.75	20.0
4	15 16.0	15 21.7	55 55.9	+1.67	56 16.8	+1.81	16 58.8	1.87	21.0
5	15 27.8	15 34.4	56 39.4	1.94	57 3.4	2.05	17 45.8	2.06	22.0
6	15 41.3	15 48.5	57 28.7	2.15	57 55.0	2.22	18 37.8	2.28	23.0
7	15 55.8	16 3.1	58 21.9	+2.25	58 48.9	+2.23	19 35.4	2.52	24.0
8	16 10.4	16 17.4	59 15.5	2.18	59 41.2	2.08	20 38.2	2.70	25.0
9	16 24.0	16 29.9	60 5.3	1.91	60 27.0	1.68	21 44.0	2.75	26.0
10	16 35.0	16 39.1	60 45.7	+1.41	61 0.8	+1.09	22 49.3	2.66	27.0
11	16 42.1	16 43.8	61 11.8	+0.72	61 18.2	+0.32	23 51.2	2.49	28.0
12	16 44.2	16 43.3	61 19.6	−0.09	61 16.1	−0.50	6	. .	29.0
13	16 41.0	16 37.4	61 7.7	−0.89	60 54.7	−1.26	0 48.5	2.29	0.7
14	16 32.7	16 27.0	60 37.5	1.59	60 16.6	1.86	1 41.4	2.12	1.7
15	16 20.5	16 13.4	59 52.8	2.08	59 26.7	2.24	2 31.0	2.02	2.7
16	16 5.9	15 58.1	58 59.0	−2.35	58 30.4	−2.39	3 18.8	1.97	3.7
17	15 50.3	15 42.5	58 1.7	2.38	57 33.3	2.33	4 6.1	1.97	4.7
18	15 35.0	15 27.8	57 5.7	2.25	56 39.4	2.13	4 54.0	2.02	5.7
19	15 21.1	15 14.9	56 14.6	−1.99	55 51.7	−1.83	5 43.3	2.09	6.7
20	15 9.2	15 4.1	55 30.8	1.65	55 12.1	1.47	6 34.2	2.15	7.7
21	14 59.6	14 55.7	54 55.6	1.28	54 41.3	1.10	7 26.3	2.18	8.7
22	14 52.4	14 49.7	54 29.3	−0.91	54 19.5	−0.73	8 18.7	2.17	9.7
23	14 47.6	14 46.0	54 11.7	0.57	54 5.9	0.40	9 10.2	2.11	10.7
24	14 45.0	14 44.5	54 2.1	−0.24	54 0.1	−0.10	9 59.8	2.01	11.7
25	14 44.4	14 44.7	53 59.8	+0.04	54 1.0	+0.16	10 46.7	1.90	12.7
26	14 45.4	14 46.5	54 3.7	0.28	54 7.8	0.39	11 31.1	1.80	13.7
27	14 48.0	14 49.8	54 13.1	0.50	54 19.7	0.60	12 13.3	1.72	14.7
28	14 51.9	14 54.3	54 27.4	+0.69	54 36.2	+0.78	12 54.1	1.68	15.7
29	14 57.0	15 0.0	54 46.1	0.87	54 57.1	0.96	13 34.3	1.68	16.7
30	15 3.3	15 6.9	55 9.2	1.05	55 22.4	1.15	14 15.0	1.72	17.7
31	15 10.8	15 15.0	55 36.7	1.24	55 52.2	1.33	14 57.4	1.82	18.7
32	15 19.5	15 24.3	56 8.7	+1.42	56 26.4	+1.52	15 42.6	1.96	19.7

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	THURSDAY 1.					SATURDAY 3.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	23 8 58.05	1.7980	S. 8 10 8.9	13.763	0	0 35 1.40	1.8166	N. 3 17 38.9	14.603
1	23 10 45.89	1.7967	7 56 22.1	13.798	1	0 36 50.46	1.8188	3 32 15.1	14.602
2	23 12 33.65	1.7953	7 42 33.2	13.832	2	0 38 39.66	1.8212	3 46 51.1	14.598
3	23 14 21.33	1.7942	7 28 42.3	13.866	3	0 40 29.01	1.8237	4 1 26.9	14.596
4	23 16 8.95	1.7932	7 14 49.3	13.899	4	0 42 18.51	1.8262	4 16 2.5	14.592
5	23 17 56.51	1.7921	7 0 54.4	13.931	5	0 44 8.16	1.8288	4 30 37.9	14.587
6	23 19 44.00	1.7911	6 46 57.6	13.962	6	0 45 57.97	1.8316	4 45 13.0	14.581
7	23 21 31.44	1.7902	6 32 58.9	13.993	7	0 47 47.95	1.8344	4 59 47.7	14.574
8	23 23 18.82	1.7893	6 18 58.4	14.023	8	0 49 38.10	1.8373	5 14 21.9	14.567
9	23 25 6.16	1.7886	6 4 56.1	14.052	9	0 51 28.42	1.8403	5 28 55.7	14.559
10	23 26 53.45	1.7878	5 50 52.1	14.081	10	0 53 18.93	1.8433	5 43 29.0	14.549
11	23 28 40.70	1.7872	5 36 46.4	14.109	11	0 55 9.62	1.8464	5 58 1.6	14.538
12	23 30 27.92	1.7867	5 22 39.0	14.136	12	0 57 0.50	1.8497	6 12 33.6	14.527
13	23 32 15.10	1.7862	5 8 30.1	14.162	13	0 58 51.58	1.8530	6 27 4.9	14.516
14	23 34 2.26	1.7858	4 54 19.6	14.188	14	1 0 42.86	1.8563	6 41 35.5	14.502
15	23 35 49.40	1.7855	4 40 7.6	14.213	15	1 2 34.34	1.8598	6 56 5.2	14.488
16	23 37 36.52	1.7852	4 25 54.1	14.237	16	1 4 26.04	1.8634	7 10 34.1	14.474
17	23 39 23.62	1.7849	4 11 39.2	14.260	17	1 6 17.95	1.8671	7 25 2.1	14.458
18	23 41 10.71	1.7848	3 57 22.9	14.282	18	1 8 10.09	1.8709	7 39 29.1	14.442
19	23 42 57.80	1.7848	3 43 5.3	14.304	19	1 10 2.46	1.8747	7 53 55.1	14.424
20	23 44 44.88	1.7848	3 28 46.4	14.325	20	1 11 55.05	1.8786	8 8 20.0	14.406
21	23 46 31.97	1.7849	3 14 26.3	14.345	21	1 13 47.89	1.8827	8 22 43.8	14.386
22	23 48 19.07	1.7851	3 0 5.0	14.365	22	1 15 40.97	1.8867	8 37 6.3	14.365
23	23 50 6.18	1.7853	S. 2 45 42.5	14.384	23	1 17 34.29	1.8908	N. 8 51 27.6	14.344
	FRIDAY 2.					SUNDAY 4.			
0	23 51 53.31	1.7857	S. 2 31 18.9	14.402	0	1 19 27.87	1.8952	N. 9 5 47.6	14.322
1	23 53 40.46	1.7860	2 16 54.3	14.419	1	1 21 21.71	1.8995	9 20 6.2	14.298
2	23 55 27.63	1.7865	2 2 28.6	14.436	2	1 23 15.81	1.9039	9 34 23.3	14.273
3	23 57 14.84	1.7871	1 48 2.0	14.452	3	1 25 10.18	1.9085	9 48 39.0	14.248
4	23 59 2.08	1.7877	1 33 34.4	14.467	4	1 27 4.83	1.9132	10 2 53.1	14.221
5	0 0 49.36	1.7883	1 19 6.0	14.480	5	1 28 59.76	1.9178	10 17 5.5	14.193
6	0 2 36.68	1.7891	1 4 36.8	14.493	6	1 30 54.97	1.9227	10 31 16.2	14.164
7	0 4 24.05	1.7900	0 50 6.8	14.507	7	1 32 50.48	1.9276	10 45 25.2	14.135
8	0 6 11.48	1.7909	0 35 36.0	14.519	8	1 34 46.28	1.9325	10 59 32.4	14.104
9	0 7 58.96	1.7919	0 21 4.5	14.530	9	1 36 42.38	1.9375	11 13 37.7	14.072
10	0 9 46.51	1.7930	S. 0 6 32.4	14.540	10	1 38 38.78	1.9427	11 27 41.0	14.038
11	0 11 34.12	1.7942	N. 0 8 0.3	14.550	11	1 40 35.50	1.9480	11 41 42.3	14.004
12	0 13 21.81	1.7954	0 22 33.6	14.559	12	1 42 32.54	1.9533	11 55 41.5	13.969
13	0 15 9.57	1.7967	0 37 7.4	14.567	13	1 44 29.90	1.9587	12 9 38.6	13.932
14	0 16 57.41	1.7981	0 51 41.6	14.574	14	1 46 27.58	1.9642	12 23 33.4	13.894
15	0 18 45.34	1.7996	1 6 16.3	14.581	15	1 48 25.60	1.9698	12 37 25.9	13.856
16	0 20 33.36	1.8012	1 20 51.3	14.586	16	1 50 23.96	1.9755	12 51 16.1	13.816
17	0 22 21.48	1.8028	1 35 26.6	14.591	17	1 52 22.66	1.9813	13 5 3.9	13.775
18	0 24 9.70	1.8045	1 50 2.2	14.596	18	1 54 21.71	1.9872	13 18 49.1	13.732
19	0 25 58.02	1.8063	2 4 38.1	14.599	19	1 56 21.12	1.9931	13 32 31.7	13.688
20	0 27 46.46	1.8082	2 19 14.1	14.601	20	1 58 20.88	1.9991	13 46 11.7	13.643
21	0 29 35.01	1.8102	2 33 50.2	14.603	21	2 0 21.01	2.0052	13 59 48.9	13.597
22	0 31 23.68	1.8122	2 48 26.4	14.604	22	2 2 21.51	2.0114	14 13 23.4	13.551
23	0 33 12.47	1.8143	3 3 2.7	14.604	23	2 4 22.38	2.0177	14 26 55.0	13.502
24	0 35 1.40	1.8166	N. 3 17 38.9	14.603	24	2 6 23.63	2.0240	N. 14 40 23.6	13.452

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	MONDAY 5.					WEDNESDAY 7.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	2 6 23.63	2.0240	N.14 40 23.6	13.452	0	3 52 17.96	2.4102	N.24 0 39.5	9.261
1	2 8 25.26	2.0305	14 53 49.2	13.401	1	3 54 42.84	2.4192	24 9 51.3	9.131
2	2 10 27.29	2.0371	15 7 11.7	13.348	2	3 57 8.26	2.4282	24 18 55.2	8.999
3	2 12 29.71	2.0437	15 20 31.0	13.294	3	3 59 34.22	2.4371	24 27 51.2	8.866
4	2 14 32.53	2.0504	15 33 47.0	13.238	4	4 2 0.71	2.4460	24 36 39.1	8.729
5	2 16 35.76	2.0572	15 46 59.6	13.182	5	4 4 27.74	2.4550	24 45 18.7	8.591
6	2 18 39.40	2.0641	16 0 8.8	13.124	6	4 6 55.31	2.4640	24 53 50.0	8.451
7	2 20 43.45	2.0710	16 13 14.5	13.065	7	4 9 23.42	2.4728	25 2 12.9	8.311
8	2 22 47.92	2.0781	16 26 16.6	13.004	8	4 11 52.05	2.4816	25 10 27.3	8.168
9	2 24 52.82	2.0852	16 39 15.0	12.942	9	4 14 21.21	2.4904	25 18 33.0	8.022
10	2 26 58.15	2.0924	16 52 9.7	12.879	10	4 16 50.90	2.4992	25 26 29.9	7.873
11	2 29 3.91	2.0997	17 5 0.5	12.813	11	4 19 21.12	2.5080	25 34 17.8	7.724
12	2 31 10.11	2.1070	17 17 47.3	12.747	12	4 21 51.86	2.5167	25 41 56.8	7.574
13	2 33 16.75	2.1144	17 30 30.1	12.679	13	4 24 23.12	2.5253	25 49 26.7	7.421
14	2 35 23.84	2.1220	17 43 8.8	12.610	14	4 26 54.90	2.5339	25 56 47.3	7.265
15	2 37 31.39	2.1296	17 55 43.3	12.539	15	4 29 27.19	2.5425	26 3 58.5	7.108
16	2 39 39.39	2.1372	18 8 13.5	12.467	16	4 32 0.00	2.5510	26 11 0.3	6.950
17	2 41 47.85	2.1449	18 20 39.3	12.392	17	4 34 33.31	2.5593	26 17 52.5	6.789
18	2 43 56.78	2.1527	18 33 0.6	12.317	18	4 37 7.12	2.5676	26 24 35.0	6.627
19	2 46 6.17	2.1605	18 45 17.3	12.239	19	4 39 41.42	2.5758	26 31 7.7	6.463
20	2 48 16.04	2.1685	18 57 29.3	12.161	20	4 42 16.22	2.5841	26 37 30.5	6.297
21	2 50 26.39	2.1765	19 9 36.6	12.081	21	4 44 51.51	2.5922	26 43 43.3	6.129
22	2 52 37.22	2.1845	19 21 39.0	11.999	22	4 47 27.28	2.6002	26 49 46.0	5.959
23	2 54 48.53	2.1926	N.19 33 36.5	11.916	23	4 50 3.53	2.6080	N.26 55 38.4	5.787
	TUESDAY 6.					THURSDAY 8.			
0	2 57 0.33	2.2008	N.19 45 28.9	11.830	0	4 52 40.24	2.6158	N.27 1 20.5	5.614
1	2 59 12.62	2.2090	19 57 16.1	11.743	1	4 55 17.42	2.6235	27 6 52.1	5.439
2	3 1 25.41	2.2173	20 8 58.1	11.655	2	4 57 55.06	2.6311	27 12 13.2	5.262
3	3 3 38.70	2.2257	20 20 34.7	11.565	3	5 0 33.15	2.6385	27 17 23.6	5.083
4	3 5 52.50	2.2342	20 32 5.9	11.473	4	5 3 11.68	2.6458	27 22 23.2	4.903
5	3 8 6.80	2.2426	20 43 31.5	11.379	5	5 5 50.65	2.6531	27 27 12.0	4.722
6	3 10 21.61	2.2511	20 54 51.4	11.283	6	5 8 30.05	2.6602	27 31 49.8	4.538
7	3 12 36.93	2.2597	21 6 5.5	11.187	7	5 11 9.87	2.6672	27 36 16.6	4.353
8	3 14 52.77	2.2683	21 17 13.8	11.088	8	5 13 50.11	2.6740	27 40 32.2	4.166
9	3 17 9.12	2.2769	21 28 16.1	10.987	9	5 16 30.75	2.6807	27 44 36.5	3.978
10	3 19 26.00	2.2857	21 39 12.3	10.885	10	5 19 11.79	2.6872	27 48 29.5	3.788
11	3 21 43.40	2.2943	21 50 2.3	10.782	11	5 21 53.22	2.6936	27 52 11.1	3.597
12	3 24 1.32	2.3031	22 0 46.1	10.676	12	5 24 35.03	2.6999	27 55 41.2	3.404
13	3 26 19.77	2.3119	22 11 23.4	10.568	13	5 27 17.20	2.7059	27 58 59.6	3.210
14	3 28 38.75	2.3207	22 21 54.2	10.458	14	5 29 59.73	2.7118	28 2 6.4	3.015
15	3 30 58.26	2.3296	22 32 18.4	10.347	15	5 32 42.61	2.7176	28 5 1.4	2.818
16	3 33 18.30	2.3385	22 42 35.8	10.233	16	5 35 25.84	2.7232	28 7 44.5	2.619
17	3 35 38.88	2.3474	22 52 46.4	10.118	17	5 38 9.39	2.7285	28 10 15.7	2.420
18	3 37 59.99	2.3563	23 2 50.0	10.002	18	5 40 53.26	2.7337	28 12 34.9	2.219
19	3 40 21.64	2.3653	23 12 46.6	9.883	19	5 43 37.44	2.7387	28 14 42.0	2.017
20	3 42 43.83	2.3743	23 22 36.0	9.762	20	5 46 21.91	2.7436	28 16 37.0	1.814
21	3 45 6.55	2.3833	23 32 18.1	9.640	21	5 49 6.67	2.7483	28 18 19.7	1.610
22	3 47 29.82	2.3923	23 41 52.8	9.516	22	5 51 51.71	2.7528	28 19 50.2	1.405
23	3 49 53.62	2.4012	23 51 20.0	9.389	23	5 54 37.01	2.7571	28 21 8.3	1.198
24	3 52 17.96	2.4102	N.24 0 39.5	9.261	24	5 57 22.56	2.7612	N.28 22 14.0	0.991

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	FRIDAY 9.					SUNDAY 11.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	5 57 22.56	2.7612	N.28 22 14.0	0.991	0	8 10 35.67	2.7112	N.25 5 18.7	9.044
1	6 0 8.35	2.7651	28 23 7.2	0.782	1	8 13 18.17	2.7056	24 56 10.4	9.232
2	6 2 54.37	2.7688	28 23 47.9	0.573	2	8 16 0.34	2.6999	24 46 50.9	9.418
3	6 5 40.61	2.7723	28 24 16.0	0.363	3	8 18 42.16	2.6941	24 37 20.2	9.603
4	6 8 27.05	2.7755	28 24 31.5	+0.153	4	8 21 23.63	2.6882	24 27 38.5	9.786
5	6 11 13.67	2.7786	28 24 34.4	−0.058	5	8 24 4.74	2.6821	24 17 45.9	9.968
6	6 14 0.47	2.7813	28 24 24.5	0.271	6	8 26 45.48	2.6759	24 7 42.5	10.147
7	6 16 47.43	2.7840	28 24 1.9	0.483	7	8 29 25.85	2.6697	23 57 28.3	10.324
8	6 19 34.55	2.7865	28 23 26.5	0.697	8	8 32 5.84	2.6633	23 47 3.5	10.501
9	6 22 21.81	2.7887	28 22 38.3	0.910	9	8 34 45.45	2.6569	23 36 28.2	10.674
10	6 25 9.19	2.7906	28 21 37.3	1.124	10	8 37 24.67	2.6503	23 25 42.6	10.845
11	6 27 56.68	2.7924	28 20 23.4	1.339	11	8 40 3.49	2.6437	23 14 46.8	11.015
12	6 30 44.28	2.7940	28 18 56.6	1.554	12	8 42 41.91	2.6369	23 3 40.8	11.183
13	6 33 31.96	2.7953	28 17 16.9	1.770	13	8 45 19.92	2.6301	22 52 24.8	11.348
14	6 36 19.72	2.7965	28 15 24.2	1.986	14	8 47 57.52	2.6232	22 40 59.0	11.512
15	6 39 7.54	2.7973	28 13 18.6	2.201	15	8 50 34.70	2.6163	22 29 23.4	11.673
16	6 41 55.40	2.7979	28 11 0.1	2.417	16	8 53 11.47	2.6093	22 17 38.2	11.832
17	6 44 43.29	2.7984	28 8 28.6	2.632	17	8 55 47.81	2.6022	22 5 43.5	11.990
18	6 47 31.21	2.7987	28 5 44.2	2.848	18	8 58 23.73	2.5951	21 53 39.4	12.145
19	6 50 19.13	2.7986	28 2 46.8	3.065	19	9 0 59.22	2.5879	21 41 26.1	12.297
20	6 53 7.04	2.7984	27 59 36.4	3.281	20	9 3 34.28	2.5807	21 29 3.7	12.448
21	6 55 54.94	2.7981	27 56 13.1	3.496	21	9 6 8.90	2.5734	21 16 32.3	12.597
22	6 58 42.81	2.7974	27 52 36.9	3.711	22	9 8 43.09	2.5662	21 3 52.1	12.743
23	7 1 30.63	2.7965	N.27 48 47.8	3.926	23	9 11 16.84	2.5588	N.20 51 3.2	12.887
	SATURDAY 10.					MONDAY 12.			
0	7 4 18.39	2.7954	N.27 44 45.8	4.141	0	9 13 50.15	2.5514	N.20 38 5.7	13.028
1	7 7 6.08	2.7941	27 40 30.9	4.356	1	9 16 23.01	2.5440	20 24 59.8	13.168
2	7 9 53.68	2.7926	27 36 3.1	4.571	2	9 18 55.43	2.5366	20 11 45.6	13.305
3	7 12 41.19	2.7909	27 31 22.5	4.783	3	9 21 27.40	2.5292	19 58 23.2	13.439
4	7 15 28.59	2.7890	27 26 29.2	4.995	4	9 23 58.93	2.5218	19 44 52.9	13.571
5	7 18 15.87	2.7868	27 21 23.1	5.207	5	9 26 30.01	2.5143	19 31 14.7	13.702
6	7 21 3.01	2.7844	27 16 4.3	5.418	6	9 29 0.64	2.5068	19 17 28.7	13.829
7	7 23 50.00	2.7819	27 10 32.9	5.629	7	9 31 30.83	2.4994	19 3 35.2	13.954
8	7 26 36.84	2.7792	27 4 48.8	5.839	8	9 34 0.57	2.4919	18 49 34.2	14.077
9	7 29 23.51	2.7763	26 58 52.2	6.048	9	9 36 29.86	2.4844	18 35 25.9	14.198
10	7 32 9.99	2.7732	26 52 43.1	6.256	10	9 38 58.70	2.4770	18 21 10.5	14.316
11	7 34 56.28	2.7698	26 46 21.5	6.463	11	9 41 27.10	2.4696	18 6 48.0	14.432
12	7 37 42.37	2.7663	26 39 47.5	6.669	12	9 43 55.05	2.4622	17 52 18.7	14.545
13	7 40 28.24	2.7626	26 33 1.2	6.874	13	9 46 22.56	2.4547	17 37 42.6	14.656
14	7 43 13.88	2.7587	26 26 2.6	7.078	14	9 48 49.62	2.4473	17 23 0.0	14.764
15	7 45 59.29	2.7547	26 18 51.8	7.281	15	9 51 16.24	2.4401	17 8 10.9	14.871
16	7 48 44.45	2.7505	26 11 28.9	7.483	16	9 53 42.43	2.4328	16 53 15.5	14.975
17	7 51 29.35	2.7462	26 3 53.9	7.683	17	9 56 8.17	2.4254	16 38 13.9	15.077
18	7 54 13.99	2.7417	25 56 6.9	7.882	18	9 58 33.48	2.4182	16 23 6.3	15.176
19	7 56 58.35	2.7369	25 48 8.1	8.079	19	10 0 58.35	2.4109	16 7 52.9	15.272
20	7 59 42.42	2.7321	25 39 57.5	8.274	20	10 3 22.79	2.4038	15 52 33.7	15.366
21	8 2 26.20	2.7271	25 31 35.2	8.469	21	10 5 46.80	2.3967	15 37 8.9	15.459
22	8 5 9.67	2.7219	25 23 1.2	8.662	22	10 8 10.39	2.3896	15 21 38.6	15.548
23	8 7 52.83	2.7167	25 14 15.7	8.854	23	10 10 33.55	2.3824	15 6 3.1	15.635
24	8 10 35.67	2.7112	N.25 5 18.7	9.044	24	10 12 56.28	2.3754	N.14 50 22.4	15.720

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	TUESDAY 13.					THURSDAY 15.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	10 12 56.28	2.3754	N. 14 50 22.4	15.720	0	12 0 12.43	2.1257	N. 1 20 7.3	17.254
1	10 15 18.60	2.3685	14 34 36.7	15.802	1	12 2 19.88	2.1226	1 2 52.5	17.239
2	10 17 40.50	2.3616	14 18 46.1	15.883	2	12 4 27.14	2.1196	0 45 38.6	17.222
3	10 20 1.99	2.3548	14 2 50.7	15.962	3	12 6 34.23	2.1168	0 28 25.8	17.204
4	10 22 23.07	2.3480	13 46 50.7	16.037	4	12 8 41.15	2.1140	N. 0 11 14.1	17.185
5	10 24 43.75	2.3413	13 30 46.3	16.109	5	12 10 47.91	2.1113	S. 0 5 56.4	17.163
6	10 27 4.02	2.3346	13 14 37.6	16.180	6	12 12 54.50	2.1086	0 23 5.5	17.140
7	10 29 23.90	2.3280	12 58 24.7	16.249	7	12 15 0.94	2.1060	0 40 13.2	17.116
8	10 31 43.38	2.3214	12 42 7.7	16.316	8	12 17 7.22	2.1035	0 57 19.4	17.090
9	10 34 2.47	2.3150	12 25 46.8	16.380	9	12 19 13.36	2.1012	1 14 24.0	17.062
10	10 36 21.18	2.3086	12 9 22.1	16.442	10	12 21 19.37	2.0990	1 31 26.8	17.033
11	10 38 39.50	2.3022	11 52 53.8	16.501	11	12 23 25.24	2.0968	1 48 27.9	17.002
12	10 40 57.44	2.2959	11 36 22.0	16.558	12	12 25 30.99	2.0948	2 5 27.1	16.970
13	10 43 15.01	2.2898	11 19 46.8	16.614	13	12 27 36.61	2.0928	2 22 24.3	16.937
14	10 45 32.21	2.2837	11 3 8.3	16.667	14	12 29 42.12	2.0908	2 39 19.5	16.902
15	10 47 49.05	2.2776	10 46 26.8	16.717	15	12 31 47.51	2.0889	2 56 12.5	16.865
16	10 50 5.52	2.2716	10 29 42.3	16.766	16	12 33 52.79	2.0872	3 13 3.3	16.827
17	10 52 21.64	2.2657	10 12 54.9	16.812	17	12 35 57.97	2.0856	3 29 51.7	16.787
18	10 54 37.41	2.2599	9 56 4.8	16.856	18	12 38 3.05	2.0840	3 46 37.7	16.747
19	10 56 52.83	2.2542	9 39 12.2	16.898	19	12 40 8.04	2.0824	4 3 21.3	16.705
20	10 59 7.91	2.2485	9 22 17.1	16.938	20	12 42 12.95	2.0811	4 20 2.3	16.662
21	11 1 22.65	2.2429	9 5 19.6	16.977	21	12 44 17.78	2.0798	4 36 40.7	16.617
22	11 3 37.06	2.2375	8 48 19.9	17.012	22	12 46 22.53	2.0786	4 53 16.3	16.570
23	11 5 51.15	2.2321	N. 8 31 18.2	17.045	23	12 48 27.21	2.0774	S. 5 9 49.1	16.522
	WEDNESDAY 14.					FRIDAY 16.			
0	11 8 4.91	2.2268	N. 8 14 14.5	17.077	0	12 50 31.82	2.0763	S. 5 26 19.0	16.473
1	11 10 18.36	2.2215	7 57 9.0	17.106	1	12 52 36.37	2.0753	5 42 45.9	16.423
2	11 12 31.49	2.2163	7 40 1.8	17.133	2	12 54 40.86	2.0744	5 59 9.8	16.372
3	11 14 44.32	2.2113	7 22 53.0	17.159	3	12 56 45.30	2.0737	6 15 30.6	16.320
4	11 16 56.85	2.2063	7 5 42.7	17.182	4	12 58 49.70	2.0729	6 31 48.2	16.266
5	11 19 9.08	2.2014	6 48 31.1	17.203	5	13 0 54.05	2.0723	6 48 2.5	16.210
6	11 21 21.02	2.1967	6 31 18.3	17.223	6	13 2 58.37	2.0718	7 4 13.4	16.153
7	11 23 32.68	2.1920	6 14 4.3	17.241	7	13 5 2.66	2.0712	7 20 20.9	16.097
8	11 25 44.06	2.1873	5 56 49.4	17.256	8	13 7 6.92	2.0707	7 36 25.0	16.038
9	11 27 55.16	2.1828	5 39 33.6	17.270	9	13 9 11.15	2.0704	7 52 25.5	15.978
10	11 30 5.99	2.1783	5 22 17.0	17.282	10	13 11 15.37	2.0702	8 8 22.3	15.916
11	11 32 16.56	2.1740	5 4 59.8	17.292	11	13 13 19.58	2.0700	8 24 15.4	15.853
12	11 34 26.87	2.1698	4 47 42.1	17.299	12	13 15 23.77	2.0698	8 40 4.7	15.790
13	11 36 36.93	2.1656	4 30 23.9	17.305	13	13 17 27.96	2.0698	8 55 50.2	15.725
14	11 38 46.74	2.1615	4 13 5.4	17.310	14	13 19 32.15	2.0699	9 11 31.7	15.659
15	11 40 56.31	2.1575	3 55 46.7	17.312	15	13 21 36.35	2.0700	9 27 9.3	15.592
16	11 43 5.64	2.1536	3 38 28.0	17.313	16	13 23 40.55	2.0702	9 42 42.8	15.523
17	11 45 14.74	2.1498	3 21 9.2	17.312	17	13 25 44.77	2.0704	9 58 12.1	15.454
18	11 47 23.62	2.1461	3 3 50.6	17.308	18	13 27 49.00	2.0707	10 13 37.3	15.384
19	11 49 32.27	2.1424	2 46 32.2	17.304	19	13 29 53.26	2.0712	10 28 58.2	15.312
20	11 51 40.71	2.1389	2 29 14.1	17.298	20	13 31 57.55	2.0717	10 44 14.8	15.240
21	11 53 48.94	2.1355	2 11 56.5	17.289	21	13 34 1.86	2.0722	10 59 27.0	15.167
22	11 55 56.97	2.1322	1 54 39.4	17.279	22	13 36 6.21	2.0728	11 14 34.8	15.092
23	11 58 4.80	2.1288	1 37 23.0	17.267	23	13 38 10.59	2.0734	11 29 38.0	15.015
24	12 0 12.43	2.1257	N. 1 20 7.3	17.254	24	13 40 15.02	2.0742	S. 11 44 36.6	14.938

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	SATURDAY 17.					MONDAY 19.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	13 40 15.02	2.0742	S.11 44 36.6	14.938	0	15 21 40.06	2.1664	S.21 55 11.0	10.174
1	13 42 19.50	2.0750	11 59 30.6	14.861	1	15 23 50.12	2.1690	22 5 17.9	10.055
2	13 44 24.02	2.0758	12 14 19.9	14.782	2	15 26 0.34	2.1716	22 15 17.6	9.936
3	13 46 28.60	2.0767	12 29 4.4	14.702	3	15 28 10.71	2.1741	22 25 10.2	9.816
4	13 48 33.23	2.0777	12 43 44.1	14.621	4	15 30 21.23	2.1767	22 34 55.5	9.695
5	13 50 37.93	2.0788	12 58 18.9	14.539	5	15 32 31.91	2.1793	22 44 33.6	9.573
6	13 52 42.69	2.0799	13 12 48.8	14.456	6	15 34 42.75	2.1820	22 54 4.3	9.451
7	13 54 47.52	2.0811	13 27 13.6	14.372	7	15 36 53.75	2.1846	23 3 27.7	9.329
8	13 56 52.42	2.0823	13 41 33.4	14.287	8	15 39 4.90	2.1871	23 12 43.8	9.206
9	13 58 57.40	2.0837	13 55 48.0	14.201	9	15 41 16.20	2.1897	23 21 52.4	9.082
10	14 1 2.46	2.0850	14 9 57.5	14.115	10	15 43 27.66	2.1923	23 30 53.6	8.957
11	14 3 7.60	2.0863	14 24 1.8	14.027	11	15 45 39.27	2.1948	23 39 47.2	8.831
12	14 5 12.82	2.0878	14 38 0.7	13.938	12	15 47 51.04	2.1974	23 48 33.3	8.706
13	14 7 18.13	2.0893	14 51 54.3	13.848	13	15 50 2.96	2.1999	23 57 11.9	8.579
14	14 9 23.54	2.0909	15 5 42.5	13.757	14	15 52 15.03	2.2024	24 5 42.8	8.452
15	14 11 29.04	2.0925	15 19 25.2	13.666	15	15 54 27.25	2.2049	24 14 6.1	8.324
16	14 13 34.64	2.0942	15 33 2.4	13.573	16	15 56 39.62	2.2074	24 22 21.7	8.197
17	14 15 40.34	2.0959	15 46 34.0	13.480	17	15 58 52.14	2.2098	24 30 29.7	8.068
18	14 17 46.15	2.0977	16 0 0.0	13.386	18	16 1 4.80	2.2123	24 38 29.9	7.938
19	14 19 52.06	2.0994	16 13 20.3	13.291	19	16 3 17.61	2.2147	24 46 22.3	7.808
20	14 21 58.08	2.1013	16 26 34.9	13.195	20	16 5 30.56	2.2171	24 54 6.9	7.678
21	14 24 4.21	2.1032	16 39 43.7	13.098	21	16 7 43.66	2.2195	25 1 43.6	7.547
22	14 26 10.46	2.1052	16 52 46.7	13.000	22	16 9 56.90	2.2218	25 9 12.5	7.416
23	14 28 16.83	2.1071	S.17 5 43.7	12.901	23	16 12 10.27	2.2240	S.25 16 33.5	7.284
	SUNDAY 18.					TUESDAY 20.			
0	14 30 23.31	2.1091	S.17 18 34.8	12.802	0	16 14 23.78	2.2263	S.25 23 46.6	7.152
1	14 32 29.92	2.1112	17 31 19.9	12.702	1	16 16 37.43	2.2286	25 30 51.7	7.019
2	14 34 36.65	2.1133	17 43 59.0	12.601	2	16 18 51.21	2.2308	25 37 48.9	6.886
3	14 36 43.51	2.1154	17 56 32.0	12.498	3	16 21 5.12	2.2329	25 44 38.0	6.752
4	14 38 50.50	2.1176	18 8 58.8	12.395	4	16 23 19.16	2.2350	25 51 19.1	6.617
5	14 40 57.62	2.1198	18 21 19.4	12.292	5	16 25 33.32	2.2371	25 57 52.1	6.482
6	14 43 4.87	2.1220	18 33 33.8	12.187	6	16 27 47.61	2.2391	26 4 17.0	6.347
7	14 45 12.26	2.1243	18 45 41.9	12.082	7	16 30 2.01	2.2411	26 10 33.8	6.212
8	14 47 19.79	2.1266	18 57 43.7	11.977	8	16 32 16.54	2.2431	26 16 42.4	6.076
9	14 49 27.45	2.1289	19 9 39.1	11.869	9	16 34 31.18	2.2450	26 22 42.9	5.940
10	14 51 35.26	2.1313	19 21 28.0	11.761	10	16 36 45.94	2.2469	26 28 35.2	5.803
11	14 53 43.21	2.1337	19 33 10.4	11.652	11	16 39 0.81	2.2487	26 34 19.2	5.665
12	14 55 51.30	2.1361	19 44 46.3	11.543	12	16 41 15.78	2.2504	26 39 55.0	5.528
13	14 57 59.54	2.1385	19 56 15.6	11.433	13	16 43 30.86	2.2522	26 45 22.6	5.390
14	15 0 7.92	2.1409	20 7 38.3	11.323	14	16 45 46.04	2.2538	26 50 41.8	5.252
15	15 2 16.45	2.1434	20 18 54.4	11.212	15	16 48 1.31	2.2553	26 55 52.8	5.114
16	15 4 25.13	2.1459	20 30 3.7	11.098	16	16 50 16.68	2.2569	27 0 55.5	4.975
17	15 6 33.96	2.1484	20 41 6.2	10.986	17	16 52 32.14	2.2584	27 5 49.8	4.835
18	15 8 42.94	2.1510	20 52 2.0	10.872	18	16 54 47.69	2.2598	27 10 35.7	4.696
19	15 10 52.08	2.1536	21 2 50.9	10.757	19	16 57 3.32	2.2612	27 15 13.3	4.557
20	15 13 1.37	2.1561	21 13 32.9	10.642	20	16 59 19.04	2.2626	27 19 42.5	4.416
21	15 15 10.81	2.1586	21 24 7.9	10.526	21	17 1 34.83	2.2638	27 24 3.2	4.275
22	15 17 20.40	2.1612	21 34 36.0	10.409	22	17 3 50.69	2.2649	27 28 15.5	4.135
23	15 19 30.15	2.1638	21 44 57.0	10.292	23	17 6 6.62	2.2661	27 32 19.4	3.995
24	15 21 40.06	2.1664	S.21 55 11.0	10.174	24	17 8 22.62	2.2672	S.27 36 14.9	3.854

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	WEDNESDAY 21.					FRIDAY 23.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	17 8 22.62	2.2672	S.27 36 14.9	3.854	0	18 57 0.66	2.2300	S.27 58 11.9	2.884
1	17 10 38.68	2.2681	27 40 1.9	3.712	1	18 59 14.38	2.2273	27 55 14.8	3.019
2	17 12 54.79	2.2690	27 43 40.4	3.571	2	19 1 27.94	2.2247	27 52 9.6	3.152
3	17 15 10.96	2.2699	27 47 10.4	3.430	3	19 3 41.34	2.2219	27 48 56.5	3.285
4	17 17 27.18	2.2707	27 50 32.0	3.289	4	19 5 54.57	2.2192	27 45 35.4	3.417
5	17 19 43.44	2.2713	27 53 45.1	3.147	5	19 8 7.64	2.2163	27 42 6.4	3.550
6	17 21 59.74	2.2720	27 56 49.6	3.004	6	19 10 20.53	2.2133	27 38 29.4	3.682
7	17 24 16.08	2.2726	27 59 45.6	2.862	7	19 12 33.24	2.2103	27 34 44.6	3.813
8	17 26 32.45	2.2730	28 2 33.1	2.720	8	19 14 45.77	2.2073	27 30 51.9	3.943
9	17 28 48.84	2.2734	28 5 12.0	2.577	9	19 16 58.12	2.2043	27 26 51.4	4.073
10	17 31 5.26	2.2738	28 7 42.4	2.435	10	19 19 10.28	2.2012	27 22 43.2	4.202
11	17 33 21.70	2.2742	28 10 4.3	2.293	11	19 21 22.26	2.1980	27 18 27.2	4.331
12	17 35 38.16	2.2743	28 12 17.6	2.151	12	19 23 34.04	2.1947	27 14 3.5	4.458
13	17 37 54.62	2.2744	28 14 22.4	2.008	13	19 25 45.62	2.1914	27 9 32.2	4.586
14	17 40 11.09	2.2745	28 16 18.6	1.866	14	19 27 57.01	2.1881	27 4 53.2	4.713
15	17 42 27.56	2.2745	28 18 6.3	1.723	15	19 30 8.19	2.1846	27 0 6.6	4.839
16	17 44 44.03	2.2744	28 19 45.4	1.581	16	19 32 19.16	2.1812	26 55 12.5	4.965
17	17 47 0.49	2.2742	28 21 16.0	1.439	17	19 34 29.93	2.1777	26 50 10.8	5.090
18	17 49 16.93	2.2739	28 22 38.1	1.297	18	19 36 40.48	2.1741	26 45 1.7	5.214
19	17 51 33.36	2.2736	28 23 51.6	1.154	19	19 38 50.82	2.1705	26 39 45.1	5.338
20	17 53 49.76	2.2731	28 24 56.6	1.012	20	19 41 0.94	2.1668	26 34 21.1	5.461
21	17 56 6.13	2.2726	28 25 53.0	0.869	21	19 43 10.84	2.1632	26 28 49.8	5.583
22	17 58 22.47	2.2721	28 26 40.9	0.727	22	19 45 20.52	2.1595	26 23 11.2	5.704
23	18 0 38.78	2.2714	S.28 27 20.3	0.586	23	19 47 29.98	2.1558	S.26 17 25.3	5.826
	THURSDAY 22.					SATURDAY 24.			
0	18 2 55.04	2.2707	S.28 27 51.2	0.444	0	19 49 39.21	2.1519	S.26 11 32.1	5.946
1	18 5 11.26	2.2698	28 28 13.6	0.302	1	19 51 48.21	2.1481	26 5 31.8	6.065
2	18 7 27.42	2.2689	28 28 27.4	0.161	2	19 53 56.98	2.1442	25 59 24.3	6.184
3	18 9 43.53	2.2680	28 28 32.8	−0.019	3	19 56 5.52	2.1403	25 53 9.7	6.302
4	18 11 59.58	2.2669	28 28 29.7	+0.122	4	19 58 13.82	2.1364	25 46 48.0	6.420
5	18 14 15.56	2.2658	28 28 18.1	0.263	5	20 0 21.89	2.1325	25 40 19.3	6.537
6	18 16 31.47	2.2646	28 27 58.1	0.403	6	20 2 29.72	2.1285	25 33 43.6	6.653
7	18 18 47.31	2.2633	28 27 29.7	0.544	7	20 4 37.31	2.1245	25 27 1.0	6.768
8	18 21 3.07	2.2619	28 26 52.8	0.685	8	20 6 44.66	2.1205	25 20 11.5	6.882
9	18 23 18.74	2.2605	28 26 7.5	0.825	9	20 8 51.77	2.1164	25 13 15.2	6.996
10	18 25 34.33	2.2590	28 25 13.8	0.964	10	20 10 58.63	2.1123	25 6 12.0	7.109
11	18 27 49.82	2.2573	28 24 11.8	1.103	11	20 13 5.24	2.1082	24 59 2.1	7.220
12	18 30 5.21	2.2557	28 23 1.4	1.243	12	20 15 11.61	2.1041	24 51 45.6	7.331
13	18 32 20.50	2.2539	28 21 42.6	1.382	13	20 17 17.73	2.0999	24 44 22.4	7.442
14	18 34 35.68	2.2521	28 20 15.6	1.520	14	20 19 23.60	2.0958	24 36 52.6	7.552
15	18 36 50.75	2.2503	28 18 40.2	1.659	15	20 21 29.23	2.0917	24 29 16.2	7.661
16	18 39 5.71	2.2483	28 16 56.5	1.797	16	20 23 34.60	2.0874	24 21 33.3	7.769
17	18 41 20.54	2.2462	28 15 4.6	1.934	17	20 25 39.72	2.0833	24 13 43.9	7.877
18	18 43 35.25	2.2441	28 13 4.4	2.072	18	20 27 44.59	2.0791	24 5 48.1	7.983
19	18 45 49.83	2.2419	28 10 56.0	2.208	19	20 29 49.21	2.0748	23 57 46.0	8.088
20	18 48 4.28	2.2397	28 8 39.5	2.343	20	20 31 53.57	2.0706	23 49 37.5	8.193
21	18 50 18.59	2.2373	28 6 14.8	2.480	21	20 33 57.68	2.0663	23 41 22.8	8.297
22	18 52 32.76	2.2349	28 3 41.9	2.616	22	20 36 1.53	2.0621	23 33 1.8	8.401
23	18 54 46.78	2.2325	28 1 0.9	2.750	23	20 38 5.13	2.0579	23 24 34.7	8.503
24	18 57 0.66	2.2300	S.27 58 11.9	2.884	24	20 40 8.48	2.0537	S.23 16 1.4	8.605

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	SUNDAY 25.					TUESDAY 27.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	20 40 8.48	2.0537	S.23 16 1.4	8.605	0	22 14 5.38	1.8712	S.14 41 59.1	12.486
1	20 42 11.57	2.0494	23 7 22.1	8.706	1	22 15 57.56	1.8682	14 29 28.1	12.546
2	20 44 14.41	2.0452	22 58 36.7	8.806	2	22 17 49.57	1.8653	14 16 53.6	12.605
3	20 46 17.00	2.0410	22 49 45.4	8.904	3	22 19 41.40	1.8624	14 4 15.5	12.663
4	20 48 19.33	2.0368	22 40 48.2	9.003	4	22 21 33.06	1.8597	13 51 34.0	12.721
5	20 50 21.41	2.0325	22 31 45.1	9.101	5	22 23 24.56	1.8569	13 38 49.0	12.777
6	20 52 23.23	2.0283	22 22 36.1	9.198	6	22 25 15.89	1.8542	13 26 0.7	12.833
7	20 54 24.80	2.0241	22 13 21.4	9.293	7	22 27 7.06	1.8515	13 13 9.0	12.889
8	20 56 26.12	2.0198	22 4 1.0	9.388	8	22 28 58.07	1.8489	13 0 14.0	12.943
9	20 58 27.18	2.0156	21 54 34.9	9.483	9	22 30 48.93	1.8464	12 47 15.8	12.996
10	21 0 27.99	2.0114	21 45 3.1	9.576	10	22 32 39.64	1.8438	12 34 14.5	13.048
11	21 2 28.55	2.0072	21 35 25.8	9.668	11	22 34 30.19	1.8413	12 21 10.0	13.101
12	21 4 28.86	2.0031	21 25 43.0	9.759	12	22 36 20.60	1.8390	12 8 2.4	13.152
13	21 6 28.92	1.9990	21 15 54.7	9.850	13	22 38 10.87	1.8367	11 54 51.8	13.202
14	21 8 28.74	1.9949	21 6 1.0	9.939	14	22 40 1.00	1.8343	11 41 38.2	13.251
15	21 10 28.31	1.9908	20 56 2.0	10.028	15	22 41 50.99	1.8321	11 28 21.7	13.299
16	21 12 27.63	1.9866	20 45 57.6	10.117	16	22 43 40.85	1.8299	11 15 2.3	13.347
17	21 14 26.70	1.9825	20 35 47.9	10.204	17	22 45 30.58	1.8278	11 1 40.1	13.393
18	21 16 25.53	1.9785	20 25 33.1	10.290	18	22 47 20.19	1.8257	10 48 15.1	13.439
19	21 18 24.12	1.9745	20 15 13.1	10.377	19	22 49 9.67	1.8237	10 34 47.4	13.484
20	21 20 22.47	1.9704	20 4 47.9	10.462	20	22 50 59.04	1.8218	10 21 17.0	13.529
21	21 22 20.57	1.9664	19 54 17.7	10.544	21	22 52 48.29	1.8199	10 7 43.9	13.573
22	21 24 18.44	1.9625	19 43 42.5	10.627	22	22 54 37.43	1.8181	9 54 8.2	13.616
23	21 26 16.07	1.9586	S.19 33 2.4	10.710	23	22 56 26.46	1.8163	S. 9 40 30.0	13.657
	MONDAY 26.					WEDNESDAY 28.			
0	21 28 13.47	1.9547	S.19 22 17.4	10.791	0	22 58 15.38	1.8145	S. 9 26 49.4	13.698
1	21 30 10.63	1.9508	19 11 27.5	10.872	1	23 0 4.20	1.8129	9 13 6.3	13.738
2	21 32 7.56	1.9469	19 0 32.8	10.951	2	23 1 52.93	1.8113	8 59 20.8	13.778
3	21 34 4.26	1.9431	18 49 33.4	11.029	3	23 3 41.56	1.8098	8 45 32.9	13.817
4	21 36 0.73	1.9393	18 38 29.3	11.107	4	23 5 30.11	1.8084	8 31 42.8	13.854
5	21 37 56.97	1.9355	18 27 20.5	11.184	5	23 7 18.57	1.8069	8 17 50.4	13.892
6	21 39 52.99	1.9318	18 16 7.2	11.260	6	23 9 6.94	1.8055	8 3 55.8	13.928
7	21 41 48.78	1.9280	18 4 49.3	11.336	7	23 10 55.23	1.8043	7 49 59.1	13.963
8	21 43 44.35	1.9244	17 53 26.9	11.411	8	23 12 43.45	1.8031	7 36 0.3	13.998
9	21 45 39.71	1.9208	17 42 0.0	11.484	9	23 14 31.60	1.8019	7 21 59.4	14.032
10	21 47 34.85	1.9173	17 30 28.8	11.557	10	23 16 19.68	1.8008	7 7 56.5	14.064
11	21 49 29.78	1.9137	17 18 53.2	11.629	11	23 18 7.69	1.7997	6 53 51.7	14.096
12	21 51 24.49	1.9101	17 7 13.3	11.700	12	23 19 55.64	1.7987	6 39 45.0	14.127
13	21 53 18.99	1.9067	16 55 29.2	11.770	13	23 21 43.54	1.7978	6 25 36.4	14.158
14	21 55 13.29	1.9032	16 43 40.9	11.839	14	23 23 31.38	1.7970	6 11 26.0	14.187
15	21 57 7.38	1.8998	16 31 48.5	11.907	15	23 25 19.18	1.7962	5 57 13.9	14.215
16	21 59 1.26	1.8964	16 19 52.0	11.975	16	23 27 6.93	1.7955	5 43 0.1	14.244
17	22 0 54.95	1.8932	16 7 51.5	12.042	17	23 28 54.64	1.7948	5 28 44.6	14.272
18	22 2 48.44	1.8899	15 55 47.0	12.108	18	23 30 42.31	1.7942	5 14 27.5	14.298
19	22 4 41.74	1.8867	15 43 38.5	12.173	19	23 32 29.95	1.7937	5 0 8.8	14.323
20	22 6 34.84	1.8834	15 31 26.2	12.237	20	23 34 17.56	1.7933	4 45 48.6	14.348
21	22 8 27.75	1.8803	15 19 10.0	12.301	21	23 36 5.15	1.7929	4 31 27.0	14.372
22	22 10 20.48	1.8772	15 6 50.1	12.363	22	23 37 52.71	1.7926	4 17 3.9	14.396
23	22 12 13.02	1.8742	14 54 26.4	12.425	23	23 39 40.26	1.7924	4 2 39.5	14.418
24	22 14 5.38	1.8712	S.14 41 59.1	12.486	24	23 41 27.80	1.7922	S. 3 48 13.8	14.439

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	THURSDAY 29.			
	h m s	s	° ′ ″	″
0	23 41 27.80	1.7922	S. 3 48 13.8	14.439
1	23 43 15.33	1.7921	3 33 46.8	14.460
2	23 45 2.85	1.7920	3 19 18.6	14.479
3	23 46 50.37	1.7921	3 4 49.3	14.498
4	23 48 37.90	1.7922	2 50 18.8	14.517
5	23 50 25.43	1.7923	2 35 47.3	14.534
6	23 52 12.97	1.7925	2 21 14.7	14.551
7	23 54 0.53	1.7928	2 6 41.2	14.567
8	23 55 48.11	1.7932	1 52 6.7	14.582
9	23 57 35.72	1.7937	1 37 31.4	14.596
10	23 59 23.35	1.7942	1 22 55.2	14.609
11	0 1 11.02	1.7947	1 8 18.3	14.621
12	0 2 58.72	1.7953	0 53 40.7	14.632
13	0 4 46.46	1.7961	0 39 2.4	14.643
14	0 6 34.25	1.7969	0 24 23.5	14.653
15	0 8 22.09	1.7978	S. 0 9 44.0	14.662
16	0 10 9.99	1.7987	N. 0 4 56.0	14.671
17	0 11 57.94	1.7997	0 19 36.5	14.678
18	0 13 45.96	1.8008	0 34 17.4	14.685
19	0 15 34.04	1.8020	0 48 58.7	14.691
20	0 17 22.20	1.8032	1 3 40.3	14.695
21	0 19 10.43	1.8045	1 18 22.1	14.699
22	0 20 58.74	1.8059	1 33 4.2	14.702
23	0 22 47.14	1.8074	N. 1 47 46.4	14.704
	FRIDAY 30.			
0	0 24 35.63	1.8089	N. 2 2 28.7	14.706
1	0 26 24.21	1.8105	2 17 11.1	14.707
2	0 28 12.89	1.8122	2 31 53.5	14.706
3	0 30 1.68	1.8140	2 46 35.8	14.704
4	0 31 50.57	1.8158	3 1 18.0	14.702
5	0 33 39.57	1.8177	3 16 0.1	14.699
6	0 35 28.69	1.8197	3 30 41.9	14.695
7	0 37 17.93	1.8218	3 45 23.5	14.691
8	0 39 7.30	1.8239	4 0 4.8	14.685
9	0 40 56.80	1.8261	4 14 45.7	14.678
10	0 42 46.43	1.8283	4 29 26.2	14.671
11	0 44 36.20	1.8307	4 44 6.2	14.662
12	0 46 26.11	1.8331	4 58 45.6	14.653
13	0 48 16.17	1.8357	5 13 24.5	14.643
14	0 50 6.39	1.8383	5 28 2.7	14.631
15	0 51 56.76	1.8409	5 42 40.2	14.618
16	0 53 47.30	1.8437	5 57 16.9	14.605
17	0 55 38.00	1.8465	6 11 52.8	14.592
18	0 57 28.88	1.8494	6 26 27.9	14.577
19	0 59 19.93	1.8523	6 41 2.0	14.561
20	1 1 11.16	1.8554	6 55 35.2	14.544
21	1 3 2.58	1.8586	7 10 7.3	14.526
22	1 4 54.19	1.8618	7 24 38.3	14.507
23	1 6 45.99	1.8651	7 39 8.1	14.487
24	1 8 38.00	1.8685	N. 7 53 36.7	14.466

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	SATURDAY 31.			
	h m s	s	° ′ ″	″
0	1 8 38.00	1.8685	N. 7 53 36.7	14.466
1	1 10 30.21	1.8719	8 8 4.0	14.444
2	1 12 22.63	1.8754	8 22 30.0	14.422
3	1 14 15.26	1.8790	8 36 54.6	14.398
4	1 16 8.11	1.8827	8 51 17.7	14.373
5	1 18 1.18	1.8864	9 5 39.3	14.347
6	1 19 54.48	1.8903	9 19 59.3	14.320
7	1 21 48.02	1.8942	9 34 17.7	14.292
8	1 23 41.79	1.8982	9 48 34.3	14.263
9	1 25 35.80	1.9023	10 2 49.2	14.233
10	1 27 30.06	1.9065	10 17 2.3	14.202
11	1 29 24.58	1.9107	10 31 13.5	14.170
12	1 31 19.35	1.9150	10 45 22.7	14.137
13	1 33 14.38	1.9194	10 59 29.9	14.103
14	1 35 9.68	1.9239	11 13 35.0	14.067
15	1 37 5.25	1.9285	11 27 37.9	14.030
16	1 39 1.10	1.9331	11 41 38.6	13.992
17	1 40 57.22	1.9378	11 55 37.0	13.954
18	1 42 53.63	1.9426	12 9 33.1	13.915
19	1 44 50.33	1.9475	12 23 26.8	13.873
20	1 46 47.33	1.9524	12 37 17.9	13.831
21	1 48 44.62	1.9573	12 51 6.5	13.788
22	1 50 42.21	1.9624	13 4 52.5	13.744
23	1 52 40.11	1.9677	N. 13 18 35.8	13.698
	SUNDAY, SEPTEMBER 1.			
0	1 54 38.33	1.9729	N. 13 32 16.3	13.652

PHASES OF THE MOON.

			d	h	m
☾	Last Quarter . .	Aug.	5	16	17.6
●	New Moon		12	7	57.6
☽	First Quarter		19	4	56.6
○	Full Moon		27	7	58.9

			d	h
☾	Perigee	Aug.	11	21.6
☾	Apogee		24	20.6

AT GREENWICH APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S					Sidereal Time of Semidiameter Passing Meridian.	Equation of Time, to be Subtracted from Apparent Time.	Diff. for 1 Hour.
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.	Semidiameter.			
		h m s	s	° ′ ″	″	′ ″	s	m s	s
SUN.	1	10 41 5.75	9.069	N. 8 19 50.7	−54.39	15 53.05	64.38	0 1.54	0.785
Mon.	2	10 44 43.26	9.058	7 58 1.6	54.72	15 53.27	64.34	0 20.53	0.797
Tues.	3	10 48 20.51	9.046	7 36 4.6	55.04	15 53.50	64.30	0 39.78	0.808
Wed.	4	10 51 57.51	9.036	7 14 0.0	−55.35	15 53.73	64.26	0 59.28	0.817
Thur.	5	10 55 34.28	9.027	6 51 48.3	55.64	15 53.96	64.23	1 19.01	0.826
Frid.	6	10 59 10.84	9.019	6 29 29.7	55.92	15 54.19	64.19	1 38.95	0.835
Sat.	7	11 2 47.20	9.011	6 7 4.5	−56.18	15 54.43	64.16	1 59.08	0.843
SUN.	8	11 6 23.38	9.004	5 44 33.1	56.43	15 54.67	64.13	2 19.39	0.850
Mon.	9	11 9 59.41	8.998	5 21 55.8	56.67	15 54.92	64.10	2 39.87	0.856
Tues.	10	11 13 35.29	8.992	4 59 13.1	−56.89	15 55.17	64.08	3 0.50	0.862
Wed.	11	11 17 11.03	8.986	4 36 25.1	57.10	15 55.42	64.06	3 21.26	0.867
Thur.	12	11 20 46.65	8.981	4 13 32.4	57.29	15 55.67	64.04	3 42.13	0.872
Frid.	13	11 24 22.16	8.977	3 50 35.3	−57.47	15 55.93	64.03	4 3.10	0.876
Sat.	14	11 27 57.58	8.974	3 27 34.1	57.63	15 56.19	64.02	4 24.17	0.879
SUN.	15	11 31 32.94	8.972	3 4 29.2	57.77	15 56.45	64.01	4 45.31	0.882
Mon.	16	11 35 8.25	8.970	2 41 21.0	−57.90	15 56.71	64.01	5 6.50	0.884
Tues.	17	11 38 43.52	8.969	2 18 9.8	58.02	15 56.98	64.01	5 27.72	0.885
Wed.	18	11 42 18.77	8.969	1 54 56.0	58.13	15 57.25	64.01	5 48.97	0.885
Thur.	19	11 45 54.03	8.970	1 31 39.8	−58.22	15 57.52	64.02	6 10.20	0.884
Frid.	20	11 49 29.32	8.971	1 8 21.6	58.30	15 57.79	64.03	6 31.41	0.883
Sat.	21	11 53 4.66	8.972	0 45 1.7	58.36	15 58.07	64.04	6 52.57	0.880
SUN.	22	11 56 40.07	8.975	N. 0 21 40.4	−58.41	15 58.34	64.05	7 13.66	0.877
Mon.	23	12 0 15.57	8.980	S. 0 1 41.9	58.44	15 58.62	64.07	7 34.66	0.872
Tues.	24	12 3 51.18	8.986	0 25 4.9	58.46	15 58.90	64.09	7 55.55	0.867
Wed.	25	12 7 26.93	8.993	0 48 28.2	−58.47	15 59.17	64.11	8 16.29	0.861
Thur.	26	12 11 2.84	9.000	1 11 51.5	58.46	15 59.44	64.14	8 36.88	0.854
Frid.	27	12 14 38.94	9.009	1 35 14.5	58.44	15 59.71	64.17	8 57.28	0.846
Sat.	28	12 18 15.24	9.018	1 58 36.9	−58.41	15 59.98	64.20	9 17.47	0.837
SUN.	29	12 21 51.78	9.028	2 21 58.5	58.37	16 0.25	64.23	9 37.43	0.826
Mon.	30	12 25 28.57	9.039	2 45 18.9	58.32	16 0.52	64.26	9 57.13	0.815
Tues.	31	12 29 5.64	9.051	S. 3 8 37.7	−58.25	16 0.79	64.29	10 16.56	0.803

Note.—The mean time of semidiameter passing may be found by subtracting $0^s.18$ from the sidereal time.

The sign − prefixed to the hourly change of declination indicates that north declinations are decreasing; south declinations increasing.

AT GREENWICH MEAN NOON.

Day of the Month.	THE SUN'S				Equation of Time, to be Added to Mean Time.	Diff. for 1 Hour.	Sidereal Time, or Right Ascension of Mean Sun.
	Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.			
	h m s	s	° ′ ″	″	m s	s	h m s
1	10 41 5.75	9.071	N. 8 19 50.7	−54.39	0 1.54	0.785	10 41 7.28
2	10 44 43.31	9.060	7 58 1.3	54.72	0 20.53	0.797	10 45 3.84
3	10 48 20.61	9.049	7 36 4.0	55.04	0 39.79	0.808	10 49 0.39
4	10 51 57.66	9.039	7 13 59.1	−55.35	0 59.29	0.817	10 52 56.95
5	10 55 34.48	9.030	6 51 47.1	55.64	1 19.02	0.826	10 56 53.50
6	10 59 11.08	9.022	6 29 28.2	55.92	1 38.97	0.835	11 0 50.05
7	11 2 47.49	9.014	6 7 2.7	−56.19	1 59.11	0.843	11 4 46.61
8	11 6 23.73	9.006	5 44 31.0	56.44	2 19.43	0.850	11 8 43.16
9	11 9 59.81	9.000	5 21 53.4	56.68	2 39.91	0.856	11 12 39.72
10	11 13 35.74	8.994	4 59 10.3	−56.90	3 0.54	0.862	11 16 36.27
11	11 17 11.53	8.989	4 36 22.0	57.11	3 21.30	0.867	11 20 32.82
12	11 20 47.20	8.984	4 13 28.9	57.30	3 42.18	0.872	11 24 29.38
13	11 24 22.77	8.980	3 50 31.4	−57.48	4 3.16	0.876	11 28 25.93
14	11 27 58.25	8.977	3 27 29.9	57.64	4 24.23	0.879	11 32 22.49
15	11 31 33.66	8.974	3 4 24.7	57.79	4 45.38	0.882	11 36 19.04
16	11 35 9.02	8.972	2 41 16.1	−57.92	5 6.57	0.884	11 40 15.59
17	11 38 44.34	8.971	2 18 4.5	58.04	5 27.80	0.885	11 44 12.15
18	11 42 19.65	8.971	1 54 50.3	58.14	5 49.05	0.885	11 48 8.70
19	11 45 54.96	8.972	1 31 33.7	−58.23	6 10.29	0.884	11 52 5.25
20	11 49 30.30	8.973	1 8 15.2	58.31	6 31.50	0.883	11 56 1.81
21	11 53 5.69	8.975	0 44 55.0	58.37	6 52.67	0.880	11 59 58.36
22	11 56 41.15	8.979	N. 0 21 33.4	−58.42	7 13.77	0.877	12 3 54.92
23	12 0 16.70	8.984	S. 0 1 49.2	58.46	7 34.77	0.873	12 7 51.47
24	12 3 52.36	8.989	0 25 12.5	58.48	7 55.66	0.867	12 11 48.02
25	12 7 28.16	8.995	0 48 36.1	−58.49	8 16.41	0.861	12 15 44.58
26	12 11 4.13	9.002	1 11 59.8	58.48	8 37.00	0.854	12 19 41.13
27	12 14 40.28	9.011	1 35 23.2	58.46	8 57.40	0.846	12 23 37.68
28	12 18 16.64	9.020	1 58 46.0	−58.43	9 17.60	0.837	12 27 34.24
29	12 21 53.23	9.030	2 22 7.9	58.39	9 37.56	0.826	12 31 30.79
30	12 25 30.07	9.041	2 45 28.6	58.33	9 57.27	0.815	12 35 27.34
31	12 29 7.19	9.053	S. 3 8 47.7	−58.26	10 16.70	0.803	12 39 23.90

—The semidiameter for mean noon may be assumed the same as that for apparent noon. The sign — prefixed to the hourly change of declination indicates that north declinations are decreasing; south declinations increasing.

Diff. for 1 Hour, $+9^{s}.8565$. (Table III.)

AT GREENWICH MEAN NOON.

Day of the Month.	Day of the Year.	THE SUN'S				Logarithm of the Radius Vector of the Earth.	Diff. for 1 Hour.	Mean Tin Sidereal
		True Longitude.		Diff. for 1 Hour.	Latitude.			
		λ	λ'					
		° ′ ″	′ ″	″	″			h m
1	245	158 39 26.3	38 56.2	145.20	+0.11	0.003 8334	−42.6	13 16
2	246	159 37 32.1	37 1.9	145.28	0.23	0.003 7308	42.9	13 12
3	247	160 35 39.8	35 9.5	145.36	0.33	0.003 6274	43.3	13 8
4	248	161 33 49.6	33 19.1	145.44	+0.41	0.003 5230	−43.7	13 4
5	249	162 32 1.4	31 30.8	145.53	0.46	0.003 4175	44.2	13 0
6	250	163 30 15.2	29 44.5	145.62	0.49	0.003 3108	44.7	12 57
7	251	164 28 31.1	28 0.3	145.70	+0.48	0.003 2029	−45.3	12 53
8	252	165 26 49.0	26 18.1	145.79	0.43	0.003 0936	45.9	12 49
9	253	166 25 8.9	24 37.9	145.87	0.35	0.002 9827	46.5	12 45
10	254	167 23 30.8	22 59.6	145.95	+0.26	0.002 8703	−47.1	12 41
11	255	168 21 54.6	21 23.3	146.03	0.14	0.002 7564	47.8	12 37
12	256	169 20 20.2	19 48.8	146.10	+0.01	0.002 6409	48.4	12 33
13	257	170 18 47.5	18 16.0	146.18	−0.13	0.002 5239	−49.0	12 29
14	258	171 17 16.6	16 45.0	146.25	0.27	0.002 4056	49.5	12 25
15	259	172 15 47.4	15 15.6	146.32	0.39	0.002 2860	50.0	12 21
16	260	173 14 19.8	13 47.9	146.38	−0.49	0.002 1654	−50.4	12 17
17	261	174 12 53.8	12 21.8	146.45	0.57	0.002 0439	50.8	12 13
18	262	175 11 29.5	10 57.4	146.52	0.62	0.001 9216	51.1	12 9
19	263	176 10 6.9	9 34.7	146.59	−0.64	0.001 7987	−51.3	12 5
20	264	177 8 45.9	8 13.6	146.66	0.64	0.001 6754	51.5	12 1
21	265	178 7 26.7	6 54.3	146.73	0.60	0.001 5518	51.6	11 58
22	266	179 6 9.3	5 36.8	146.81	−0.55	0.001 4280	−51.7	11 54
23	267	180 4 53.6	4 21.0	146.88	0.47	0.001 3040	51.7	11 50
24	268	181 3 39.8	3 7.1	146.96	0.36	0.001 1800	51.7	11 46
25	269	182 2 27.9	1 55.1	147.04	−0.25	0.001 0561	−51.6	11 42
26	270	183 1 18.0	0 45.0	147.13	−0.13	0.000 9323	51.5	11 38
27	271	183 60 10.1	59 36.9	147.21	0.00	0.000 8087	51.4	11 34
28	272	184 59 4.2	58 30.9	147.30	+0.14	0.000 6854	−51.3	11 30
29	273	185 58 0.4	57 27.1	147.39	0.27	0.000 5624	51.2	11 26
30	274	186 56 58.9	56 25.5	147.48	0.39	0.000 4396	51.1	11 22
31	275	187 55 59.6	55 26.1	147.58	+0.47	0.000 3170	−51.0	11 18

NOTE.—The longitudes in the column λ are referred to the true equinox of their own date, while those in the column λ' are referred to the mean equinox of the beginning of the Besselian fictitious year.

Diff. for 1 I
$-9^{s}.829$
(Table I

GREENWICH MEAN TIME.

THE MOON'S

EMIDIAMETER.		HORIZONTAL PARALLAX.				UPPER TRANSIT.		AGE.
oon.	Midnight.	Noon.	Diff. for 1 Hour.	Midnight.	Diff. for 1 Hour.	Meridian of Greenwich.	Diff. for 1 Hour.	Noon.
"	' "	' "	"	' "	"	h m	m	d
19.5	15 24.3	56 8.7	+1.42	56 26.4	+1.52	15 42.6	1.96	19.7
29.4	15 34.8	56 45.2	1.61	57 5.0	1.69	16 31.9	2.15	20.7
40.5	15 46.3	57 25.7	1.75	57 47.1	1.81	17 26.1	2.37	21.7
52.3	15 58.4	58 9.1	+1.84	58 31.3	+1.85	18 25.2	2.55	22.7
4.4	16 10.3	58 53.5	1.83	59 15.2	1.77	19 27.8	2.65	23.7
16.0	16 21.2	59 36.0	1.67	59 55.3	1.52	20 31.4	2.63	24.7
25.9	16 29.9	60 12.5	+1.33	60 27.2	+1.10	21 33.3	2.51	25.7
33.1	16 35.3	60 38.9	0.82	60 47.0	+0.51	22 31.7	2.35	26.7
36.4	16 36.4	60 51.1	+0.17	60 51.1	−0.18	23 26.1	2.20	27.7
35.2	16 32.9	60 46.7	−0.55	60 38.0	−0.90	6	. .	28.7
29.4	16 24.9	60 25.2	1.23	60 8.6	1.52	0 17.4	2.09	0.3
19.5	16 13.3	59 48.7	1.77	59 26.0	1.98	1 6.6	2.03	1.3
6.5	15 59.3	59 1.1	−2.14	58 34.7	−2.24	1 55.1	2.02	2.3
51.8	15 44.3	58 7.4	2.29	57 39.8	2.29	2 44.0	2.06	3.3
36.9	15 29.7	57 12.5	2.24	56 46.0	2.15	3 34.1	2.12	4.3
22.8	15 16.3	56 20.8	−2.03	55 57.2	−1.89	4 25.8	2.18	5.3
10.4	15 5.1	55 35.5	1.72	55 15.9	1.53	5 18.7	2.22	6.3
0.4	14 56.4	54 58.7	1.33	54 43.9	1.13	6 12.0	2.21	7.3
53.0	14 50.3	54 31.6	−0.92	54 21.7	−0.72	7 4.4	2.15	8.3
48.3	14 47.0	54 14.3	0.51	54 9.4	−0.31	7 54.9	2.05	9.3
46.3	14 46.2	54 6.8	−0.12	54 6.4	+0.05	8 42.8	1.94	10.3
46.6	14 47.6	54 8.0	+0.22	54 11.6	+0.37	9 28.1	1.84	11.3
49.0	14 50.9	54 17.0	0.51	54 23.9	0.64	10 11.1	1.75	12.3
53.2	14 55.8	54 32.3	0.75	54 41.9	0.85	10 52.4	1.70	13.3
58.7	15 1.9	54 52.6	+0.93	55 4.3	+1.00	11 33.0	1.69	14.3
5.3	15 8.9	55 16.7	1.06	55 29.7	1.11	12 13.8	1.72	15.3
12.6	15 16.4	55 43.2	1.15	55 57.2	1.18	12 56.0	1.80	16.3
20.3	15 24.3	56 11.5	+1.20	56 26.1	+1.23	13 40.8	1.93	17.3
28.3	15 32.4	56 41.0	1.25	56 56.0	1.26	14 29.1	2.10	18.3
36.5	15 40.7	57 11.2	1.27	57 26.5	1.28	15 21.8	2.29	19.3
44.9	15 49.1	57 41.9	1.29	57 57.4	1.29	16 18.9	2.46	20.3
53.3	15 57.5	58 12.8	+1.28	58 28.1	+1.26	17 19.5	2.57	21.3

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Di fc 1 M
SUNDAY 1.					TUESDAY 3.				
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	
0	1 54 38.33	1.9729	N.13 32 16.3	13.652	0	3 36 41.39	2.3008	N.23 8 58.5	9
1	1 56 36.86	1.9783	13 45 53.9	13.604	1	3 38 59.67	2.3087	23 18 44.9	9
2	1 58 35.72	1.9837	13 59 28.6	13.555	2	3 41 18.43	2.3166	23 28 24.3	9
3	2 0 34.90	1.9891	14 13 0.4	13.504	3	3 43 37.67	2.3245	23 37 56.5	9
4	2 2 34.41	1.9946	14 26 29.1	13.452	4	3 45 57.38	2.3324	23 47 21.5	9
5	2 4 34.25	2.0003	14 39 54.7	13.400	5	3 48 17.56	2.3404	23 56 39.3	9
6	2 6 34.44	2.0060	14 53 17.0	13.346	6	3 50 38.22	2.3483	24 5 49.6	9
7	2 8 34.97	2.0118	15 6 36.1	13.290	7	3 52 59.36	2.3562	24 14 52.3	8
8	2 10 35.85	2.0177	15 19 51.9	13.234	8	3 55 20.98	2.3642	24 23 47.5	8
9	2 12 37.09	2.0236	15 33 4.2	13.177	9	3 57 43.07	2.3722	24 32 35.0	8
10	2 14 38.68	2.0296	15 46 13.0	13.118	10	4 0 5.64	2.3801	24 41 14.6	8
11	2 16 40.63	2.0356	15 59 18.3	13.057	11	4 2 28.68	2.3879	24 49 46.3	8
12	2 18 42.95	2.0417	16 12 19.9	12.995	12	4 4 52.19	2.3958	24 58 10.0	8
13	2 20 45.64	2.0479	16 25 17.8	12.932	13	4 7 16.17	2.4037	25 6 25.6	8
14	2 22 48.70	2.0542	16 38 11.8	12.868	14	4 9 40.63	2.4115	25 14 32.9	8
15	2 24 52.14	2.0605	16 51 1.9	12.803	15	4 12 5.55	2.4193	25 22 32.0	7
16	2 26 55.96	2.0669	17 3 48.1	12.736	16	4 14 30.94	2.4271	25 30 22.7	7
17	2 29 0.17	2.0734	17 16 30.2	12.668	17	4 16 56.80	2.4348	25 38 4.8	7
18	2 31 4.77	2.0799	17 29 8.2	12.598	18	4 19 23.12	2.4425	25 45 38.4	7
19	2 33 9.76	2.0865	17 41 41.9	12.527	19	4 21 49.90	2.4502	25 53 3.2	7
20	2 35 15.15	2.0932	17 54 11.4	12.455	20	4 24 17.13	2.4578	26 0 19.2	7
21	2 37 20.95	2.1000	18 6 36.5	12.381	21	4 26 44.83	2.4654	26 7 26.4	7
22	2 39 27.15	2.1068	18 18 57.1	12.306	22	4 29 12.97	2.4729	26 14 24.6	6
23	2 41 33.76	2.1136	N.18 31 13.2	12.229	23	4 31 41.57	2.4803	N.26 21 13.7	6
MONDAY 2.					WEDNESDAY 4.				
0	2 43 40.78	2.1205	N.18 43 24.6	12.151	0	4 34 10.61	2.4877	N.26 27 53.6	6
1	2 45 48.22	2.1275	18 55 31.3	12.072	1	4 36 40.09	2.4951	26 34 24.2	6
2	2 47 56.08	2.1345	19 7 33.2	11.991	2	4 39 10.01	2.5024	26 40 45.5	6
3	2 50 4.37	2.1416	19 19 30.2	11.909	3	4 41 40.37	2.5096	26 46 57.3	6
4	2 52 13.08	2.1488	19 31 22.3	11.825	4	4 44 11.16	2.5167	26 52 59.5	5
5	2 54 22.22	2.1560	19 43 9.3	11.740	5	4 46 42.37	2.5237	26 58 52.1	5
6	2 56 31.80	2.1633	19 54 51.1	11.654	6	4 49 14.01	2.5307	27 4 34.9	5
7	2 58 41.81	2.1706	20 6 27.7	11.565	7	4 51 46.06	2.5376	27 10 7.9	5
8	3 0 52.26	2.1779	20 17 58.9	11.475	8	4 54 18.52	2.5444	27 15 31.0	5
9	3 3 3.16	2.1853	20 29 24.7	11.384	9	4 56 51.38	2.5511	27 20 44.0	5
10	3 5 14.51	2.1928	20 40 45.0	11.291	10	4 59 24.65	2.5577	27 25 47.0	4
11	3 7 26.30	2.2003	20 51 59.7	11.197	11	5 1 58.31	2.5642	27 30 39.8	4
12	3 9 38.54	2.2078	21 3 8.7	11.102	12	5 4 32.36	2.5706	27 35 22.3	4
13	3 11 51.23	2.2154	21 14 11.9	11.005	13	5 7 6.79	2.5770	27 39 54.4	4
14	3 14 4.38	2.2230	21 25 9.2	10.906	14	5 9 41.60	2.5832	27 44 16.1	4
15	3 16 17.99	2.2306	21 36 0.6	10.805	15	5 12 16.77	2.5892	27 48 27.3	4
16	3 18 32.06	2.2383	21 46 45.9	10.703	16	5 14 52.31	2.5952	27 52 27.9	3
17	3 20 46.59	2.2461	21 57 25.0	10.600	17	5 17 28.20	2.6011	27 56 17.8	3
18	3 23 1.58	2.2538	22 7 57.9	10.495	18	5 20 4.44	2.6068	27 59 56.9	3
19	3 25 17.04	2.2615	22 18 24.4	10.388	19	5 22 41.02	2.6124	28 3 25.2	3
20	3 27 32.97	2.2693	22 28 44.5	10.280	20	5 25 17.94	2.6179	28 6 42.6	3
21	3 29 49.37	2.2772	22 38 58.1	10.171	21	5 27 55.18	2.6233	28 9 49.0	3
22	3 32 6.24	2.2851	22 49 5.0	10.059	22	5 30 32.73	2.6285	28 12 44.4	2
23	3 34 23.58	2.2929	22 59 5.2	9.945	23	5 33 10.60	2.6335	28 15 28.6	2
24	3 36 41.39	2.3008	N.23 8 58.5	9.831	24	5 35 48.76	2.6385	N.28 18 1.7	2

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	THURSDAY 5.					SATURDAY 7.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	5 35 48.76	2.6385	N.28 18 1.7	2.457	0	7 44 56.93	2.6748	N.26 28 16.7	7.075
1	5 38 27.22	2.6433	28 20 23.5	2.268	1	7 47 37.32	2.6714	26 21 6.4	7.267
2	5 41 5.95	2.6478	28 22 33.9	2.079	2	7 50 17.50	2.6679	26 13 44.7	7.458
3	5 43 44.96	2.6523	28 24 33.0	1.890	3	7 52 57.47	2.6643	26 6 11.5	7.648
4	5 46 24.23	2.6567	28 26 20.7	1.698	4	7 55 37.22	2.6605	25 58 27.0	7.837
5	5 49 3.76	2.6608	28 27 56.8	1.506	5	7 58 16.73	2.6565	25 50 31.1	8.026
6	5 51 43.53	2.6648	28 29 21.4	1.313	6	8 0 56.00	2.6525	25 42 23.9	8.213
7	5 54 23.54	2.6687	28 30 34.4	1.119	7	8 3 35.03	2.6483	25 34 5.6	8.398
8	5 57 3.77	2.6723	28 31 35.7	0.924	8	8 6 13.80	2.6440	25 25 36.2	8.582
9	5 59 44.22	2.6758	28 32 25.3	0.729	9	8 8 52.31	2.6397	25 16 55.8	8.765
10	6 2 24.87	2.6792	28 33 3.2	0.532	10	8 11 30.56	2.6352	25 8 4.4	8.947
11	6 5 5.72	2.6824	28 33 29.2	0.335	11	8 14 8.53	2.6305	24 59 2.1	9.127
12	6 7 46.76	2.6854	28 33 43.4	+0.137	12	8 16 46.22	2.6257	24 49 49.1	9.306
13	6 10 27.97	2.6882	28 33 45.7	−0.061	13	8 19 23.62	2.6208	24 40 25.4	9.484
14	6 13 9.34	2.6908	28 33 36.1	0.260	14	8 22 0.72	2.6159	24 30 51.0	9.661
15	6 15 50.87	2.6933	28 33 14.5	0.460	15	8 24 37.53	2.6109	24 21 6.1	9.836
16	6 18 32.54	2.6957	28 32 40.9	0.661	16	8 27 14.03	2.6058	24 11 10.7	10.009
17	6 21 14.35	2.6978	28 31 55.2	0.862	17	8 29 50.22	2.6006	24 1 5.0	10.181
18	6 23 56.28	2.6997	28 30 57.5	1.062	18	8 32 26.10	2.5952	23 50 49.0	10.352
19	6 26 38.31	2.7014	28 29 47.8	1.263	19	8 35 1.65	2.5898	23 40 22.8	10.520
20	6 29 20.44	2.7030	28 28 26.0	1.465	20	8 37 36.88	2.5844	23 29 46.6	10.687
21	6 32 2.67	2.7045	28 26 52.0	1.667	21	8 40 11.78	2.5789	23 19 0.4	10.852
22	6 34 44.98	2.7057	28 25 5.9	1.869	22	8 42 46.35	2.5733	23 8 4.3	11.016
23	6 37 27.35	2.7067	N.28 23 7.7	2.072	23	8 45 20.58	2.5676	N.22 56 58.5	11.178
	FRIDAY 6.					SUNDAY 8.			
0	6 40 9.78	2.7075	N.28 20 57.3	2.275	0	8 47 54.46	2.5618	N.22 45 43.0	11.338
1	6 42 52.25	2.7082	28 18 34.7	2.478	1	8 50 28.00	2.5561	22 34 17.9	11.497
2	6 45 34.76	2.7087	28 15 59.9	2.681	2	8 53 1.19	2.5503	22 22 43.4	11.653
3	6 48 17.29	2.7090	28 13 13.0	2.883	3	8 55 34.03	2.5444	22 10 59.6	11.808
4	6 50 59.84	2.7091	28 10 13.9	3.087	4	8 58 6.52	2.5385	21 59 6.5	11.961
5	6 53 42.38	2.7089	28 7 2.6	3.290	5	9 0 38.65	2.5325	21 47 4.3	12.112
6	6 56 24.91	2.7087	28 3 39.1	3.492	6	9 3 10.42	2.5265	21 34 53.1	12.261
7	6 59 7.43	2.7083	28 0 3.5	3.695	7	9 5 41.83	2.5204	21 22 33.0	12.408
8	7 1 49.91	2.7077	27 56 15.7	3.898	8	9 8 12.87	2.5143	21 10 4.1	12.554
9	7 4 32.35	2.7069	27 52 15.8	4.100	9	9 10 43.55	2.5082	20 57 26.5	12.698
10	7 7 14.74	2.7060	27 48 3.7	4.302	10	9 13 13.86	2.5021	20 44 40.3	12.840
11	7 9 57.07	2.7048	27 43 39.5	4.503	11	9 15 43.80	2.4959	20 31 45.7	12.979
12	7 12 39.32	2.7035	27 39 3.3	4.704	12	9 18 13.37	2.4898	20 18 42.8	13.117
13	7 15 21.49	2.7020	27 34 15.0	4.906	13	9 20 42.57	2.4836	20 5 31.7	13.253
14	7 18 3.56	2.7003	27 29 14.6	5.107	14	9 23 11.40	2.4774	19 52 12.5	13.387
15	7 20 45.53	2.6985	27 24 2.2	5.307	15	9 25 39.86	2.4712	19 38 45.3	13.518
16	7 23 27.38	2.6965	27 18 37.8	5.506	16	9 28 7.94	2.4649	19 25 10.3	13.648
17	7 26 9.11	2.6944	27 13 1.5	5.704	17	9 30 35.65	2.4587	19 11 27.5	13.776
18	7 28 50.70	2.6920	27 7 13.3	5.902	18	9 33 2.99	2.4525	18 57 37.2	13.901
19	7 31 32.15	2.6895	27 1 13.3	6.099	19	9 35 29.95	2.4463	18 43 39.4	14.025
20	7 34 13.45	2.6870	26 55 1.4	6.296	20	9 37 56.54	2.4401	18 29 34.2	14.147
21	7 36 54.59	2.6843	26 48 37.8	6.492	21	9 40 22.76	2.4339	18 15 21.8	14.266
22	7 39 35.56	2.6813	26 42 2.4	6.687	22	9 42 48.61	2.4277	18 1 2.3	14.383
23	7 42 16.34	2.6781	26 35 15.4	6.881	23	9 45 14.08	2.4215	17 46 35.9	14.498
24	7 44 56.93	2.6748	N.26 28 16.7	7.075	24	9 47 39.19	2.4154	N.17 32 2.6	14.612

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	MONDAY 9.					WEDNESDAY 11.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	9 47 39.19	2.4154	N. 17 32 2.6	14.612	0	11 37 21.10	2.1797	N. 4 21 2.7	17.537
1	9 50 3.93	2.4093	17 17 22.5	14.723	1	11 39 31.78	2.1765	4 3 30.1	17.548
2	9 52 28.30	2.4032	17 2 35.9	14.831	2	11 41 42.28	2.1734	3 45 56.9	17.557
3	9 54 52.31	2.3972	16 47 42.8	14.937	3	11 43 52.59	2.1704	3 28 23.2	17.564
4	9 57 15.96	2.3911	16 32 43.4	15.042	4	11 46 2.73	2.1675	3 10 49.2	17.568
5	9 59 39.24	2.3850	16 17 37.8	15.144	5	11 48 12.69	2.1647	2 53 15.0	17.572
6	10 2 2.16	2.3790	16 2 26.1	15.245	6	11 50 22.49	2.1619	2 35 40.6	17.573
7	10 4 24.72	2.3731	15 47 8.4	15.343	7	11 52 32.12	2.1593	2 18 6.2	17.572
8	10 6 46.93	2.3672	15 31 44.9	15.439	8	11 54 41.60	2.1567	2 0 31.9	17.570
9	10 9 8.78	2.3613	15 16 15.7	15.532	9	11 56 50.92	2.1542	1 42 57.8	17.566
10	10 11 30.28	2.3554	15 0 41.0	15.624	10	11 59 0.10	2.1518	1 25 24.0	17.559
11	10 13 51.43	2.3497	14 45 0.8	15.714	11	12 1 9.13	2.1494	1 7 50.7	17.551
12	10 16 12.24	2.3439	14 29 15.3	15.802	12	12 3 18.03	2.1472	0 50 17.9	17.542
13	10 18 32.70	2.3382	14 13 24.6	15.887	13	12 5 26.79	2.1450	0 32 45.7	17.530
14	10 20 52.82	2.3326	13 57 28.9	15.970	14	12 7 35.43	2.1430	N. 0 15 14.3	17.516
15	10 23 12.61	2.3270	13 41 28.2	16.051	15	12 9 43.95	2.1410	S. 0 2 16.2	17.501
16	10 25 32.06	2.3214	13 25 22.8	16.129	16	12 11 52.35	2.1390	0 19 45.8	17.484
17	10 27 51.18	2.3160	13 9 12.7	16.206	17	12 14 0.63	2.1372	0 37 14.3	17.465
18	10 30 9.98	2.3106	12 52 58.1	16.280	18	12 16 8.81	2.1355	0 54 41.6	17.445
19	10 32 28.45	2.3051	12 36 39.1	16.352	19	12 18 16.89	2.1338	1 12 7.7	17.423
20	10 34 46.59	2.2998	12 20 15.8	16.422	20	12 20 24.87	2.1323	1 29 32.4	17.399
21	10 37 4.42	2.2946	12 3 48.4	16.491	21	12 22 32.76	2.1308	1 46 55.6	17.373
22	10 39 21.94	2.2894	11 47 16.9	16.557	22	12 24 40.56	2.1293	2 4 17.2	17.346
23	10 41 39.15	2.2843	N. 11 30 41.6	16.620	23	12 26 48.27	2.1279	S. 2 21 37.1	17.317
	TUESDAY 10.					THURSDAY 12.			
0	10 43 56.05	2.2792	N. 11 14 2.5	16.682	0	12 28 55.91	2.1267	S. 2 38 55.2	17.286
1	10 46 12.65	2.2742	10 57 19.7	16.742	1	12 31 3.47	2.1255	2 56 11.4	17.254
2	10 48 28.96	2.2693	10 40 33.5	16.798	2	12 33 10.97	2.1244	3 13 25.7	17.221
3	10 50 44.97	2.2644	10 23 43.9	16.853	3	12 35 18.40	2.1234	3 30 37.9	17.185
4	10 53 0.69	2.2596	10 6 51.1	16.907	4	12 37 25.78	2.1225	3 47 47.9	17.147
5	10 55 16.12	2.2548	9 49 55.1	16.958	5	12 39 33.10	2.1216	4 4 55.6	17.108
6	10 57 31.27	2.2502	9 32 56.1	17.007	6	12 41 40.37	2.1208	4 22 0.9	17.068
7	10 59 46.15	2.2457	9 15 54.3	17.053	7	12 43 47.59	2.1200	4 39 3.8	17.027
8	11 2 0.76	2.2412	8 58 49.7	17.099	8	12 45 54.77	2.1194	4 56 4.2	16.984
9	11 4 15.09	2.2367	8 41 42.4	17.142	9	12 48 1.92	2.1189	5 13 1.9	16.938
10	11 6 29.16	2.2323	8 24 32.7	17.182	10	12 50 9.04	2.1184	5 29 56.8	16.892
11	11 8 42.97	2.2281	8 7 20.6	17.220	11	12 52 16.13	2.1180	5 46 48.9	16.843
12	11 10 56.53	2.2239	7 50 6.3	17.257	12	12 54 23.20	2.1177	6 3 38.0	16.793
13	11 13 9.84	2.2198	7 32 49.8	17.292	13	12 56 30.25	2.1174	6 20 24.1	16.742
14	11 15 22.90	2.2157	7 15 31.3	17.324	14	12 58 37.29	2.1173	6 37 7.1	16.690
15	11 17 35.72	2.2118	6 58 10.9	17.354	15	13 0 44.32	2.1172	6 53 46.9	16.637
16	11 19 48.31	2.2079	6 40 48.8	17.383	16	13 2 51.35	2.1171	7 10 23.4	16.581
17	11 22 0.67	2.2041	6 23 25.0	17.409	17	13 4 58.37	2.1171	7 26 56.6	16.523
18	11 24 12.80	2.2003	6 5 59.7	17.433	18	13 7 5.40	2.1172	7 43 26.3	16.465
19	11 26 24.71	2.1967	5 48 33.0	17.456	19	13 9 12.44	2.1174	7 59 52.4	16.405
20	11 28 36.40	2.1931	5 31 5.0	17.476	20	13 11 19.49	2.1176	8 16 14.9	16.344
21	11 30 47.88	2.1896	5 13 35.9	17.494	21	13 13 26.55	2.1179	8 32 33.7	16.282
22	11 32 59.15	2.1862	4 56 5.7	17.511	22	13 15 33.64	2.1184	8 48 48.7	16.218
23	11 35 10.22	2.1829	4 38 34.6	17.525	23	13 17 40.76	2.1188	9 4 59.8	16.152
24	11 37 21.10	2.1797	N. 4 21 2.7	17.537	24	13 19 47.90	2.1193	S. 9 21 6.9	16.085

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	FRIDAY 13.					SUNDAY 15.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	13 19 47.90	2.1193	S. 9 21 6.9	16.085	0	15 3 9.65	2.2031	S.20 32 44.7	11.479
1	13 21 55.08	2.1199	9 37 10.0	16.017	1	15 5 21.91	2.2055	20 44 9.8	11.358
2	13 24 2.29	2.1205	9 53 8.9	15.947	2	15 7 34.31	2.2080	20 55 27.7	11.237
3	13 26 9.54	2.1213	10 9 3.6	15.876	3	15 9 46.87	2.2105	21 6 38.3	11.115
4	13 28 16.84	2.1221	10 24 54.0	15.803	4	15 11 59.57	2.2129	21 17 41.5	10.992
5	13 30 24.19	2.1229	10 40 40.0	15.730	5	15 14 12.42	2.2155	21 28 37.3	10.868
6	13 32 31.59	2.1238	10 56 21.6	15.656	6	15 16 25.43	2.2180	21 39 25.7	10.744
7	13 34 39.04	2.1248	11 11 58.7	15.579	7	15 18 38.58	2.2204	21 50 6.6	10.618
8	13 36 46.56	2.1258	11 27 31.1	15.501	8	15 20 51.88	2.2229	22 0 39.9	10.492
9	13 38 54.14	2.1268	11 42 58.8	15.422	9	15 23 5.33	2.2253	22 11 5.6	10.365
10	13 41 1.78	2.1279	11 58 21.8	15.343	10	15 25 18.92	2.2278	22 21 23.7	10.237
11	13 43 9.49	2.1292	12 13 40.0	15.262	11	15 27 32.67	2.2303	22 31 34.1	10.109
12	13 45 17.28	2.1304	12 28 53.3	15.179	12	15 29 46.56	2.2328	22 41 36.8	9.981
13	13 47 25.14	2.1318	12 44 1.5	15.095	13	15 32 0.60	2.2353	22 51 31.8	9.851
14	13 49 33.09	2.1332	12 59 4.7	15.011	14	15 34 14.79	2.2377	23 1 18.9	9.720
15	13 51 41.12	2.1345	13 14 2.8	14.925	15	15 36 29.12	2.2400	23 10 58.2	9.589
16	13 53 49.23	2.1359	13 28 55.7	14.837	16	15 38 43.59	2.2424	23 20 29.6	9.457
17	13 55 57.43	2.1375	13 43 43.3	14.748	17	15 40 58.21	2.2448	23 29 53.1	9.325
18	13 58 5.73	2.1391	13 58 25.5	14.658	18	15 43 12.97	2.2472	23 39 8.6	9.192
19	14 0 14.12	2.1407	14 13 2.3	14.568	19	15 45 27.87	2.2494	23 48 16.1	9.058
20	14 2 22.61	2.1423	14 27 33.7	14.477	20	15 47 42.90	2.2518	23 57 15.6	8.924
21	14 4 31.20	2.1441	14 41 59.5	14.383	21	15 49 58.08	2.2541	24 6 7.0	8.789
22	14 6 39.90	2.1458	14 56 19.7	14.289	22	15 52 13.39	2.2563	24 14 50.3	8.653
23	14 8 48.70	2.1476	S.15 10 34.2	14.193	23	15 54 28.83	2.2585	S.24 23 25.4	8.518
	SATURDAY 14.					MONDAY 16.			
0	14 10 57.61	2.1494	S.15 24 42.9	14.097	0	15 56 44.41	2.2607	S.24 31 52.4	8.382
1	14 13 6.63	2.1513	15 38 45.8	13.999	1	15 59 0.12	2.2629	24 40 11.2	8.244
2	14 15 15.77	2.1532	15 52 42.8	13.901	2	16 1 15.96	2.2650	24 48 21.7	8.107
3	14 17 25.02	2.1552	16 6 33.9	13.802	3	16 3 31.92	2.2671	24 56 24.0	7.968
4	14 19 34.39	2.1573	16 20 19.0	13.701	4	16 5 48.01	2.2692	25 4 17.9	7.829
5	14 21 43.89	2.1593	16 33 58.0	13.598	5	16 8 4.22	2.2712	25 12 3.5	7.690
6	14 23 53.51	2.1613	16 47 30.8	13.496	6	16 10 20.55	2.2732	25 19 40.8	7.551
7	14 26 3.25	2.1634	17 0 57.5	13.392	7	16 12 37.00	2.2751	25 27 9.6	7.410
8	14 28 13.12	2.1656	17 14 17.9	13.287	8	16 14 53.56	2.2770	25 34 30.0	7.269
9	14 30 23.12	2.1677	17 27 31.9	13.181	9	16 17 10.24	2.2788	25 41 41.9	7.128
10	14 32 33.25	2.1699	17 40 39.6	13.075	10	16 19 27.02	2.2806	25 48 45.4	6.987
11	14 34 43.51	2.1722	17 53 40.9	12.967	11	16 21 43.91	2.2824	25 55 40.4	6.846
12	14 36 53.91	2.1744	18 6 35.6	12.858	12	16 24 0.91	2.2842	26 2 26.9	6.703
13	14 39 4.44	2.1767	18 19 23.8	12.748	13	16 26 18.01	2.2858	26 9 4.8	6.561
14	14 41 15.11	2.1790	18 32 5.3	12.637	14	16 28 35.20	2.2873	26 15 34.2	6.417
15	14 43 25.92	2.1813	18 44 40.2	12.525	15	16 30 52.49	2.2889	26 21 54.9	6.273
16	14 45 36.87	2.1837	18 57 8.3	12.412	16	16 33 9.87	2.2904	26 28 7.0	6.130
17	14 47 47.96	2.1860	19 9 29.7	12.299	17	16 35 27.34	2.2918	26 34 10.5	5.987
18	14 49 59.19	2.1884	19 21 44.2	12.185	18	16 37 44.89	2.2932	26 40 5.4	5.843
19	14 52 10.57	2.1908	19 33 51.9	12.070	19	16 40 2.53	2.2946	26 45 51.6	5.698
20	14 54 22.09	2.1932	19 45 52.6	11.953	20	16 42 20.24	2.2958	26 51 29.1	5.552
21	14 56 33.76	2.1957	19 57 46.2	11.835	21	16 44 38.02	2.2970	26 56 57.8	5.407
22	14 58 45.58	2.1982	20 9 32.8	11.717	22	16 46 55.88	2.2982	27 2 17.9	5.262
23	15 0 57.54	2.2006	20 21 12.3	11.599	23	16 49 13.80	2.2993	27 7 29.2	5.116
24	15 3 9.65	2.2031	S.20 32 44.7	11.479	24	16 51 31.79	2.3003	S.27 12 31.8	4.970

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	TUESDAY 17.					THURSDAY 19.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	16 51 31.79	2.3003	S.27 12 31.8	4.970	0	18 41 43.07	2.2615	S.28 22 18.5	2.004
1	16 53 49.84	2.3012	27 17 25.6	4.823	1	18 43 58.68	2.2588	28 20 14.1	2.143
2	16 56 7.94	2.3021	27 22 10.6	4.677	2	18 46 14.12	2.2560	28 18 1.4	2.281
3	16 58 26.09	2.3029	27 26 46.9	4.531	3	18 48 29.40	2.2532	28 15 40.4	2.418
4	17 0 44.29	2.3037	27 31 14.3	4.383	4	18 50 44.51	2.2504	28 13 11.2	2.556
5	17 3 2.53	2.3043	27 35 32.9	4.237	5	18 52 59.45	2.2475	28 10 33.7	2.693
6	17 5 20.81	2.3049	27 39 42.8	4.091	6	18 55 14.21	2.2445	28 7 48.0	2.829
7	17 7 39.12	2.3055	27 43 43.8	3.943	7	18 57 28.79	2.2415	28 4 54.2	2.964
8	17 9 57.47	2.3060	27 47 36.0	3.796	8	18 59 43.19	2.2385	28 1 52.3	3.099
9	17 12 15.84	2.3063	27 51 19.3	3.648	9	19 1 57.41	2.2353	27 58 42.3	3.233
10	17 14 34.23	2.3067	27 54 53.8	3.501	10	19 4 11.43	2.2321	27 55 24.3	3.367
11	17 16 52.64	2.3069	27 58 19.4	3.353	11	19 6 25.26	2.2288	27 51 58.2	3.501
12	17 19 11.06	2.3071	28 1 36.2	3.207	12	19 8 38.89	2.2255	27 48 24.2	3.633
13	17 21 29.49	2.3072	28 4 44.2	3.059	13	19 10 52.32	2.2222	27 44 42.2	3.766
14	17 23 47.92	2.3072	28 7 43.3	2.911	14	19 13 5.55	2.2188	27 40 52.3	3.897
15	17 26 6.35	2.3071	28 10 33.5	2.763	15	19 15 18.57	2.2153	27 36 54.6	4.028
16	17 28 24.77	2.3069	28 13 14.9	2.617	16	19 17 31.38	2.2118	27 32 49.0	4.158
17	17 30 43.18	2.3067	28 15 47.5	2.469	17	19 19 43.98	2.2082	27 28 35.6	4.288
18	17 33 1.58	2.3065	28 18 11.2	2.322	18	19 21 56.36	2.2046	27 24 14.4	4.417
19	17 35 19.96	2.3061	28 20 26.1	2.174	19	19 24 8.53	2.2009	27 19 45.5	4.545
20	17 37 38.31	2.3057	28 22 32.1	2.027	20	19 26 20.47	2.1972	27 15 9.0	4.672
21	17 39 56.64	2.3052	28 24 29.3	1.880	21	19 28 32.19	2.1934	27 10 24.9	4.799
22	17 42 14.93	2.3045	28 26 17.7	1.733	22	19 30 43.68	2.1897	27 5 33.2	4.926
23	17 44 33.18	2.3038	S.28 27 57.2	1.586	23	19 32 54.95	2.1858	S.27 0 33.9	5.052
	WEDNESDAY 18.					FRIDAY 20.			
0	17 46 51.39	2.3031	S.28 29 28.0	1.440	0	19 35 5.98	2.1819	S.26 55 27.0	5.177
1	17 49 9.55	2.3022	28 30 50.0	1.293	1	19 37 16.78	2.1781	26 50 12.6	5.301
2	17 51 27.65	2.3013	28 32 3.1	1.146	2	19 39 27.35	2.1742	26 44 50.8	5.424
3	17 53 45.70	2.3003	28 33 7.5	1.000	3	19 41 37.68	2.1702	26 39 21.7	5.547
4	17 56 3.69	2.2992	28 34 3.1	0.853	4	19 43 47.77	2.1662	26 33 45.2	5.669
5	17 58 21.61	2.2981	28 34 49.9	0.707	5	19 45 57.62	2.1622	26 28 1.4	5.790
6	18 0 39.46	2.2968	28 35 28.0	0.562	6	19 48 7.23	2.1581	26 22 10.4	5.911
7	18 2 57.23	2.2955	28 35 57.4	0.417	7	19 50 16.59	2.1539	26 16 12.1	6.031
8	18 5 14.92	2.2941	28 36 18.0	0.271	8	19 52 25.70	2.1498	26 10 6.7	6.150
9	18 7 32.52	2.2926	28 36 29.9	−0.127	9	19 54 34.57	2.1457	26 3 54.1	6.268
10	18 9 50.03	2.2911	28 36 33.2	+0.017	10	19 56 43.19	2.1416	25 57 34.5	6.386
11	18 12 7.45	2.2894	28 36 27.8	0.162	11	19 58 51.56	2.1374	25 51 7.8	6.503
12	18 14 24.76	2.2877	28 36 13.8	0.307	12	20 0 59.68	2.1333	25 44 34.1	6.619
13	18 16 41.97	2.2859	28 35 51.1	0.450	13	20 3 7.55	2.1291	25 37 53.5	6.734
14	18 18 59.07	2.2840	28 35 19.8	0.593	14	20 5 15.16	2.1248	25 31 6.0	6.849
15	18 21 16.05	2.2821	28 34 39.9	0.736	15	20 7 22.52	2.1205	25 24 11.6	6.963
16	18 23 32.92	2.2801	28 33 51.5	0.878	16	20 9 29.62	2.1162	25 17 10.4	7.077
17	18 25 49.66	2.2780	28 32 54.5	1.021	17	20 11 36.46	2.1119	25 10 2.4	7.189
18	18 28 6.28	2.2758	28 31 49.0	1.163	18	20 13 43.05	2.1077	25 2 47.7	7.300
19	18 30 22.76	2.2736	28 30 35.0	1.303	19	20 15 49.38	2.1033	24 55 26.4	7.411
20	18 32 39.11	2.2713	28 29 12.6	1.444	20	20 17 55.45	2.0990	24 47 58.4	7.522
21	18 34 55.32	2.2689	28 27 41.7	1.586	21	20 20 1.26	2.0947	24 40 23.8	7.631
22	18 37 11.38	2.2665	28 26 2.3	1.726	22	20 22 6.81	2.0903	24 32 42.7	7.738
23	18 39 27.30	2.2641	28 24 14.6	1.865	23	20 24 12.10	2.0860	24 24 55.2	7.846
24	18 41 43.07	2.2615	S.28 22 18.5	2.004	24	20 26 17.13	2.0817	S.24 17 1.2	7.953

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	SATURDAY 21.					MONDAY 23.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	20 26 17.13	2.0817	S.24 17 1.2	7.953	0	22 1 27.29	1.8937	S.16 7 34.4	12.127
1	20 28 21.90	2.0773	24 9 0.8	8.059	1	22 3 20.82	1.8906	15 55 24.7	12.195
2	20 30 26.41	2.0730	24 0 54.1	8.164	2	22 5 14.16	1.8876	15 43 11.0	12.262
3	20 32 30.66	2.0687	23 52 41.1	8.269	3	22 7 7.33	1.8846	15 30 53.3	12.327
4	20 34 34.66	2.0644	23 44 21.8	8.373	4	22 9 0.31	1.8816	15 18 31.7	12.392
5	20 36 38.39	2.0600	23 35 56.4	8.475	5	22 10 53.12	1.8787	15 6 6.3	12.456
6	20 38 41.86	2.0557	23 27 24.8	8.577	6	22 12 45.76	1.8759	14 53 37.0	12.519
7	20 40 45.07	2.0513	23 18 47.1	8.678	7	22 14 38.23	1.8731	14 41 4.0	12.581
8	20 42 48.02	2.0471	23 10 3.4	8.779	8	22 16 30.53	1.8703	14 28 27.3	12.642
9	20 44 50.72	2.0428	23 1 13.6	8.879	9	22 18 22.67	1.8677	14 15 46.9	12.703
10	20 46 53.16	2.0385	22 52 17.9	8.978	10	22 20 14.65	1.8650	14 3 2.9	12.763
11	20 48 55.34	2.0342	22 43 16.3	9.075	11	22 22 6.47	1.8624	13 50 15.3	12.823
12	20 50 57.26	2.0299	22 34 8.9	9.172	12	22 23 58.14	1.8599	13 37 24.2	12.881
13	20 52 58.93	2.0257	22 24 55.7	9.268	13	22 25 49.66	1.8574	13 24 29.6	12.938
14	20 55 0.34	2.0214	22 15 36.7	9.364	14	22 27 41.03	1.8549	13 11 31.6	12.995
15	20 57 1.50	2.0173	22 6 12.0	9.459	15	22 29 32.25	1.8525	12 58 30.2	13.051
16	20 59 2.41	2.0131	21 56 41.6	9.553	16	22 31 23.33	1.8502	12 45 25.5	13.106
17	21 1 3.07	2.0088	21 47 5.6	9.646	17	22 33 14.27	1.8479	12 32 17.5	13.160
18	21 3 3.47	2.0047	21 37 24.1	9.738	18	22 35 5.08	1.8457	12 19 6.3	13.213
19	21 5 3.63	2.0006	21 27 37.0	9.830	19	22 36 55.76	1.8436	12 5 51.9	13.266
20	21 7 3.54	1.9964	21 17 44.5	9.920	20	22 38 46.31	1.8415	11 52 34.4	13.318
21	21 9 3.20	1.9925	21 7 46.6	10.010	21	22 40 36.74	1.8395	11 39 13.8	13.369
22	21 11 2.61	1.9882	20 57 43.3	10.099	22	22 42 27.05	1.8375	11 25 50.1	13.420
23	21 13 1.78	1.9842	S.20 47 34.7	10.188	23	22 44 17.24	1.8355	S.11 12 23.4	13.469
	SUNDAY 22.					TUESDAY 24.			
0	21 15 0.71	1.9802	S.20 37 20.8	10.275	0	22 46 7.31	1.8336	S.10 58 53.8	13.517
1	21 16 59.40	1.9762	20 27 1.7	10.361	1	22 47 57.27	1.8318	10 45 21.3	13.565
2	21 18 57.85	1.9722	20 16 37.5	10.447	2	22 49 47.13	1.8301	10 31 46.0	13.612
3	21 20 56.06	1.9682	20 6 8.1	10.532	3	22 51 36.88	1.8283	10 18 7.8	13.659
4	21 22 54.04	1.9643	19 55 33.6	10.617	4	22 53 26.53	1.8267	10 4 26.9	13.704
5	21 24 51.78	1.9604	19 44 54.1	10.699	5	22 55 16.08	1.8251	9 50 43.3	13.748
6	21 26 49.29	1.9566	19 34 9.7	10.782	6	22 57 5.54	1.8236	9 36 57.1	13.792
7	21 28 46.57	1.9528	19 23 20.3	10.863	7	22 58 54.91	1.8222	9 23 8.2	13.836
8	21 30 43.62	1.9490	19 12 26.1	10.944	8	23 0 44.20	1.8208	9 9 16.8	13.878
9	21 32 40.45	1.9453	19 1 27.0	11.025	9	23 2 33.40	1.8194	8 55 22.9	13.919
10	21 34 37.05	1.9416	18 50 23.1	11.104	10	23 4 22.53	1.8182	8 41 26.5	13.960
11	21 36 33.44	1.9379	18 39 14.5	11.182	11	23 6 11.58	1.8169	8 27 27.7	14.000
12	21 38 29.60	1.9342	18 28 1.2	11.260	12	23 8 0.56	1.8158	8 13 26.5	14.039
13	21 40 25.54	1.9306	18 16 43.3	11.337	13	23 9 49.47	1.8147	7 59 23.0	14.077
14	21 42 21.27	1.9271	18 5 20.8	11.413	14	23 11 38.32	1.8137	7 45 17.3	14.114
15	21 44 16.79	1.9236	17 53 53.8	11.488	15	23 13 27.11	1.8127	7 31 9.3	14.151
16	21 46 12.10	1.9201	17 42 22.3	11.562	16	23 15 15.85	1.8118	7 16 59.2	14.187
17	21 48 7.20	1.9166	17 30 46.3	11.636	17	23 17 4.53	1.8110	7 2 46.9	14.222
18	21 50 2.09	1.9132	17 19 6.0	11.708	18	23 18 53.17	1.8103	6 48 32.6	14.255
19	21 51 56.78	1.9098	17 7 21.3	11.781	19	23 20 41.76	1.8095	6 34 16.3	14.288
20	21 53 51.27	1.9066	16 55 32.3	11.852	20	23 22 30.31	1.8088	6 19 58.0	14.322
21	21 55 45.57	1.9033	16 43 39.1	11.922	21	23 24 18.82	1.8082	6 5 37.7	14.353
22	21 57 39.67	1.9001	16 31 41.6	11.992	22	23 26 7.30	1.8077	5 51 15.6	14.383
23	21 59 33.58	1.8968	16 19 40.0	12.060	23	23 27 55.75	1.8073	5 36 51.7	14.413
24	22 1 27.29	1.8937	S.16 7 34.4	12.127	24	23 29 44.18	1.8070	S. 5 22 26.0	14.442

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	WEDNESDAY 25.					FRIDAY 27.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	23 29 44.18	1.8070	S. 5 22 26.0	14.442	0	0 57 19.97	1.8702	N. 6 27 40.2	14.790
1	23 31 32.59	1.8067	5 7 58.6	14.471	1	0 59 12.27	1.8732	6 42 27.1	14.773
2	23 33 20.98	1.8063	4 53 29.5	14.498	2	1 1 4.75	1.8763	6 57 13.0	14.757
3	23 35 9.35	1.8062	4 38 58.8	14.524	3	1 2 57.42	1.8797	7 11 57.9	14.738
4	23 36 57.72	1.8061	4 24 26.6	14.550	4	1 4 50.30	1.8830	7 26 41.6	14.718
5	23 38 46.08	1.8060	4 9 52.8	14.575	5	1 6 43.38	1.8863	7 41 24.1	14.697
6	23 40 34.44	1.8061	3 55 17.6	14.599	6	1 8 36.66	1.8897	7 56 5.3	14.675
7	23 42 22.81	1.8062	3 40 40.9	14.622	7	1 10 30.14	1.8932	8 10 45.1	14.653
8	23 44 11.18	1.8063	3 26 2.9	14.644	8	1 12 23.84	1.8968	8 25 23.6	14.629
9	23 45 59.56	1.8065	3 11 23.6	14.666	9	1 14 17.76	1.9005	8 40 0.6	14.604
10	23 47 47.96	1.8068	2 56 43.0	14.687	10	1 16 11.90	1.9043	8 54 36.1	14.578
11	23 49 36.38	1.8072	2 42 1.2	14.706	11	1 18 6.27	1.9081	9 9 10.0	14.551
12	23 51 24.82	1.8076	2 27 18.3	14.724	12	1 20 0.87	1.9120	9 23 42.2	14.523
13	23 53 13.29	1.8081	2 12 34.3	14.742	13	1 21 55.71	1.9159	9 38 12.7	14.493
14	23 55 1.79	1.8087	1 57 49.2	14.760	14	1 23 50.78	1.9199	9 52 41.3	14.462
15	23 56 50.33	1.8093	1 43 3.1	14.777	15	1 25 46.10	1.9241	10 7 8.1	14.430
16	23 58 38.91	1.8100	1 28 16.0	14.792	16	1 27 41.67	1.9282	10 21 32.9	14.397
17	0 0 27.53	1.8108	1 13 28.1	14.806	17	1 29 37.49	1.9324	10 35 55.7	14.363
18	0 2 16.20	1.8116	0 58 39.3	14.820	18	1 31 33.56	1.9367	10 50 16.4	14.328
19	0 4 4.92	1.8125	0 43 49.7	14.833	19	1 33 29.90	1.9412	11 4 35.0	14.292
20	0 5 53.70	1.8135	0 28 59.4	14.844	20	1 35 26.51	1.9457	11 18 51.4	14.254
21	0 7 42.54	1.8146	S. 0 14 8.4	14.855	21	1 37 23.38	1.9502	11 33 5.5	14.215
22	0 9 31.45	1.8157	N. 0 0 43.2	14.864	22	1 39 20.53	1.9548	11 47 17.2	14.174
23	0 11 20.42	1.8168	N. 0 15 35.3	14.873	23	1 41 17.95	1.9594	N. 12 1 26.5	14.133
	THURSDAY 26.					SATURDAY 28.			
0	0 13 9.47	1.8182	N. 0 30 28.0	14.882	0	1 43 15.66	1.9643	N. 12 15 33.2	14.091
1	0 14 58.60	1.8195	0 45 21.2	14.890	1	1 45 13.66	1.9691	12 29 37.3	14.047
2	0 16 47.81	1.8208	1 0 14.8	14.896	2	1 47 11.95	1.9739	12 43 38.8	14.002
3	0 18 37.10	1.8223	1 15 8.7	14.901	3	1 49 10.53	1.9788	12 57 37.6	13.956
4	0 20 26.48	1.8238	1 30 2.9	14.906	4	1 51 9.41	1.9839	13 11 33.5	13.908
5	0 22 15.96	1.8255	1 44 57.4	14.909	5	1 53 8.60	1.9891	13 25 26.6	13.860
6	0 24 5.54	1.8272	1 59 52.0	14.912	6	1 55 8.10	1.9942	13 39 16.7	13.809
7	0 25 55.23	1.8290	2 14 46.8	14.913	7	1 57 7.90	1.9993	13 53 3.7	13.758
8	0 27 45.02	1.8308	2 29 41.6	14.913	8	1 59 8.02	2.0047	14 6 47.6	13.706
9	0 29 34.93	1.8327	2 44 36.4	14.913	9	2 1 8.46	2.0101	14 20 28.4	13.653
10	0 31 24.95	1.8347	2 59 31.2	14.912	10	2 3 9.23	2.0155	14 34 5.9	13.598
11	0 33 15.09	1.8368	3 14 25.9	14.910	11	2 5 10.32	2.0210	14 47 40.1	13.541
12	0 35 5.36	1.8389	3 29 20.4	14.907	12	2 7 11.75	2.0266	15 1 10.8	13.482
13	0 36 55.76	1.8411	3 44 14.7	14.903	13	2 9 13.51	2.0322	15 14 38.0	13.423
14	0 38 46.29	1.8433	3 59 8.7	14.898	14	2 11 15.61	2.0378	15 28 1.6	13.363
15	0 40 36.96	1.8457	4 14 2.4	14.892	15	2 13 18.05	2.0436	15 41 21.6	13.302
16	0 42 27.78	1.8482	4 28 55.7	14.884	16	2 15 20.84	2.0494	15 54 37.8	13.238
17	0 44 18.74	1.8506	4 43 48.5	14.876	17	2 17 23.98	2.0553	16 7 50.2	13.174
18	0 46 9.85	1.8532	4 58 40.8	14.867	18	2 19 27.47	2.0612	16 20 58.7	13.108
19	0 48 1.12	1.8558	5 13 32.5	14.856	19	2 21 31.32	2.0672	16 34 3.2	13.042
20	0 49 52.55	1.8586	5 28 23.5	14.845	20	2 23 35.54	2.0733	16 47 3.7	12.973
21	0 51 44.15	1.8613	5 43 13.9	14.833	21	2 25 40.12	2.0793	17 0 0.0	12.903
22	0 53 35.91	1.8642	5 58 3.5	14.820	22	2 27 45.06	2.0855	17 12 52.1	12.832
23	0 55 27.85	1.8672	6 12 52.3	14.806	23	2 29 50.38	2.0917	17 25 39.8	12.759
24	0 57 19.97	1.8702	N. 6 27 40.2	14.790	24	2 31 56.07	2.0980	N. 17 38 23.1	12.684

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	SUNDAY 29.			
	h m s	s	° ′ ″	″
0	2 31 56.07	2.0980	N.17 38 23.1	12.684
1	2 34 2.14	2.1043	17 51 1.9	12.609
2	2 36 8.59	2.1107	18 3 36.2	12.532
3	2 38 15.42	2.1171	18 16 5.8	12.454
4	2 40 22.64	2.1236	18 28 30.7	12.374
5	2 42 30.25	2.1302	18 40 50.7	12.292
6	2 44 38.26	2.1367	18 53 5.8	12.210
7	2 46 46.66	2.1433	19 5 15.9	12.126
8	2 48 55.46	2.1500	19 17 20.9	12.040
9	2 51 4.66	2.1567	19 29 20.7	11.952
10	2 53 14.26	2.1634	19 41 15.2	11.864
11	2 55 24.27	2.1702	19 53 4.4	11.774
12	2 57 34.68	2.1769	20 4 48.1	11.683
13	2 59 45.50	2.1838	20 16 26.3	11.590
14	3 1 56.74	2.1907	20 27 58.9	11.495
15	3 4 8.39	2.1977	20 39 25.7	11.398
16	3 6 20.46	2.2047	20 50 46.7	11.301
17	3 8 32.95	2.2117	21 2 1.8	11.202
18	3 10 45.86	2.2187	21 13 10.9	11.101
19	3 12 59.19	2.2257	21 24 13.9	10.999
20	3 15 12.94	2.2327	21 35 10.8	10.896
21	3 17 27.11	2.2398	21 46 1.4	10.791
22	3 19 41.71	2.2469	21 56 45.7	10.684
23	3 21 56.74	2.2541	N.22 7 23.5	10.576
	MONDAY 30.			
0	3 24 12.20	2.2612	N.22 17 54.8	10.467
1	3 26 28.09	2.2683	22 28 19.5	10.355
2	3 28 44.40	2.2754	22 38 37.4	10.242
3	3 31 1.14	2.2826	22 48 48.5	10.127
4	3 33 18.31	2.2898	22 58 52.6	10.011
5	3 35 35.92	2.2970	23 8 49.8	9.894
6	3 37 53.96	2.3042	23 18 39.9	9.775
7	3 40 12.43	2.3114	23 28 22.8	9.655
8	3 42 31.33	2.3185	23 37 58.5	9.533
9	3 44 50.65	2.3257	23 47 26.8	9.409
10	3 47 10.41	2.3329	23 56 47.6	9.283
11	3 49 30.60	2.3400	24 6 0.8	9.157
12	3 51 51.21	2.3471	24 15 6.4	9.029
13	3 54 12.25	2.3542	24 24 4.3	8.899
14	3 56 33.72	2.3613	24 32 54.3	8.768
15	3 58 55.61	2.3683	24 41 36.4	8.635
16	4 1 17.92	2.3754	24 50 10.5	8.501
17	4 3 40.66	2.3825	24 58 36.5	8.365
18	4 6 3.82	2.3895	25 6 54.3	8.228
19	4 8 27.40	2.3964	25 15 3.8	8.089
20	4 10 51.39	2.4033	25 23 5.0	7.949
21	4 13 15.79	2.4102	25 30 57.7	7.807
22	4 15 40.61	2.4170	25 38 41.8	7.663
23	4 18 5.83	2.4238	25 46 17.3	7.519
24	4 20 31.46	2.4305	N.25 53 44.1	7.373

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	TUESDAY, OCTOBER 1.			
	h m s	s	° ′ ″	″
0	4 20 31.46	2.4305	N.25 53 44.1	7.373

PHASES OF THE MOON.

			d	h	m
☾	Last Quarter . .	Sept.	4	1	23.1
●	New Moon		10	15	48.5
☽	First Quarter		17	19	54.7
○	Full Moon		25	23	34.2

			d	h
☾	Perigee	Sept.	9	6.3
☾	Apogee		21	8.3

OCTOBER, 1912.

AT GREENWICH APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S					Sidereal Time of Semidiameter Passing Meridian.	Equation of Time, to be Subtracted from Apparent Time.
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.	Semidiameter.		
		h m s	s	° ′ ″	″	′ ″	s	m s
Tues.	1	12 29 5.64	9.051	S. 3 8 37.7	−58.25	16 0.79	64.29	10 16.56
Wed.	2	12 32 43.02	9.064	3 31 54.6	58.17	16 1.06	64.33	10 35.69
Thur.	3	12 36 20.73	9.078	3 55 9.3	58.07	16 1.34	64.37	10 54.49
Frid.	4	12 39 58.78	9.093	4 18 21.4	−57.95	16 1.61	64.42	11 12.95
Sat.	5	12 43 37.19	9.109	4 41 30.7	57.82	16 1.88	64.48	11 31.04
SUN.	6	12 47 15.99	9.125	5 4 36.7	57.67	16 2.15	64.55	11 48.74
Mon.	7	12 50 55.19	9.142	5 27 38.9	−57.51	16 2.43	64.62	12 6.04
Tues.	8	12 54 34.82	9.160	5 50 37.0	57.33	16 2.71	64.68	12 22.92
Wed.	9	12 58 14.89	9.179	6 13 30.7	57.14	16 2.99	64.75	12 39.36
Thur.	10	13 1 55.41	9.198	6 36 19.5	−56.93	16 3.26	64.81	12 55.35
Frid.	11	13 5 36.39	9.218	6 59 3.1	56.70	16 3.54	64.88	13 10.88
Sat.	12	13 9 17.86	9.238	7 21 41.0	56.45	16 3.82	64.95	13 25.93
SUN.	13	13 12 59.83	9.259	7 44 12.8	−56.19	16 4.10	65.03	13 40.48
Mon.	14	13 16 42.31	9.281	8 6 38.0	55.91	16 4.37	65.11	13 54.51
Tues.	15	13 20 25.31	9.303	8 28 56.5	55.61	16 4.65	65.19	14 8.02
Wed.	16	13 24 8.86	9.326	8 51 7.6	−55.30	16 4.93	65.27	14 20.99
Thur.	17	13 27 52.97	9.350	9 13 11.0	54.97	16 5.21	65.36	14 33.40
Frid.	18	13 31 37.66	9.375	9 35 6.4	54.63	16 5.49	65.45	14 45.23
Sat.	19	13 35 22.95	9.400	9 56 53.3	−54.27	16 5.77	65.54	14 56.46
SUN.	20	13 39 8.85	9.426	10 18 31.4	53.90	16 6.05	65.63	15 7.09
Mon.	21	13 42 55.39	9.453	10 40 0.4	53.51	16 6.32	65.73	15 17.09
Tues.	22	13 46 42.57	9.480	11 1 19.8	−53.10	16 6.59	65.82	15 26.44
Wed.	23	13 50 30.41	9.508	11 22 29.1	52.68	16 6.86	65.92	15 35.13
Thur.	24	13 54 18.93	9.537	11 43 28.1	52.24	16 7.13	66.02	15 43.14
Frid.	25	13 58 8.15	9.566	12 4 16.5	−51.79	16 7.40	66.13	15 50.45
Sat.	26	14 1 58.09	9.596	12 24 53.9	51.32	16 7.66	66.23	15 57.04
SUN.	27	14 5 48.77	9.627	12 45 19.7	50.83	16 7.92	66.34	16 2.91
Mon.	28	14 9 40.19	9.659	13 5 33.7	−50.33	16 8.18	66.45	16 8.03
Tues.	29	14 13 32.38	9.691	13 25 35.5	49.81	16 8.43	66.56	16 12.38
Wed.	30	14 17 25.34	9.724	13 45 24.7	49.28	16 8.68	66.67	16 15.95
Thur.	31	14 21 19.11	9.757	14 5 1.0	48.73	16 8.93	66.78	16 18.73
Frid.	32	14 25 13.69	9.791	S. 14 24 23.8	−48.16	16 9.18	66.89	16 20.71

Note.—The mean time of semidiameter passing may be found by subtracting $0^{s}.18$ from the sidereal time.
The sign − prefixed to the hourly change of declination indicates that south declinations are increas

AT GREENWICH MEAN NOON.

Day of the Week.	Day of the Month.	THE SUN'S				Equation of Time, to be Added to Mean Time.	Diff. for 1 Hour.	Sidereal Time, or Right Ascension of Mean Sun.
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.			
		h m s	s	° ′ ″	″	m s	s	h m s
Tues.	1	12 29 7.19	9.053	S. 3 8 47.7	−58.26	10 16.70	0.803	12 39 23.90
Wed.	2	12 32 44.62	9.066	3 32 4.9	58.17	10 35.83	0.790	12 43 20.46
Thur.	3	12 36 22.38	9.080	3 55 19.9	58.07	10 54.63	0.776	12 47 17.01
Frid.	4	12 40 0.48	9.095	4 18 32.3	−57.96	11 13.09	0.761	12 51 13.56
Sat.	5	12 43 38.94	9.111	4 41 41.8	57.83	11 31.18	0.745	12 55 10.12
SUN.	6	12 47 17.79	9.127	5 4 48.0	57.68	11 48.88	0.729	12 59 6.67
Mon.	7	12 50 57.04	9.144	5 27 50.5	−57.52	12 6.18	0.712	13 3 3.22
Tues.	8	12 54 36.72	9.162	5 50 48.9	57.34	12 23.06	0.694	13 6 59.78
Wed.	9	12 58 16.83	9.181	6 13 42.8	57.15	12 39.50	0.676	13 10 56.33
Thur.	10	13 1 57.39	9.200	6 36 31.8	−56.93	12 55.49	0.657	13 14 52.88
Frid.	11	13 5 38.42	9.220	6 59 15.5	56.70	13 11.02	0.637	13 18 49.44
Sat.	12	13 9 19.93	9.240	7 21 53.6	56.46	13 26.07	0.616	13 22 45.99
SUN.	13	13 13 1.94	9.261	7 44 25.6	−56.20	13 40.61	0.595	13 26 42.55
Mon.	14	13 16 44.46	9.283	8 6 51.1	55.92	13 54.64	0.574	13 30 39.10
Tues.	15	13 20 27.50	9.305	8 29 9.6	55.62	14 8.15	0.551	13 34 35.66
Wed.	16	13 24 11.09	9.328	8 51 20.8	−55.31	14 21.12	0.528	13 38 32.21
Thur.	17	13 27 55.24	9.352	9 13 24.3	54.98	14 33.52	0.504	13 42 28.76
Frid.	18	13 31 39.97	9.376	9 35 19.8	54.64	14 45.34	0.480	13 46 25.32
Sat.	19	13 35 25.30	9.401	9 57 6.8	−54.28	14 56.57	0.455	13 50 21.87
SUN.	20	13 39 11.24	9.427	10 18 45.0	53.90	15 7.19	0.430	13 54 18.43
Mon.	21	13 42 57.80	9.454	10 40 14.0	53.51	15 17.19	0.404	13 58 14.98
Tues.	22	13 46 45.01	9.481	11 1 33.4	−53.10	15 26.54	0.376	14 2 11.54
Wed.	23	13 50 32.88	9.509	11 22 42.8	52.68	15 35.22	0.348	14 6 8.09
Thur.	24	13 54 21.43	9.538	11 43 41.9	52.24	15 43.22	0.319	14 10 4.65
Frid.	25	13 58 10.68	9.567	12 4 30.2	−51.78	15 50.52	0.289	14 14 1.20
Sat.	26	14 2 0.64	9.597	12 25 7.5	51.31	15 57.11	0.259	14 17 57.76
SUN.	27	14 5 51.34	9.628	12 45 33.3	50.83	16 2.97	0.228	14 21 54.31
Mon.	28	14 9 42.79	9.660	13 5 47.2	−50.33	16 8.08	0.197	14 25 50.87
Tues.	29	14 13 35.00	9.692	13 25 48.9	49.81	16 12.43	0.165	14 29 47.42
Wed.	30	14 17 27.99	9.725	13 45 38.0	49.28	16 16.00	0.132	14 33 43.98
Thur.	31	14 21 21.77	9.758	14 5 14.2	48.73	16 18.77	0.099	14 37 40.53
Frid.	32	14 25 16.36	9.792	S. 14 24 36.9	−48.16	16 20.73	0.065	14 41 37.09

Note.—The semidiameter for mean noon may be assumed the same as that for apparent noon. The sign − prefixed to the hourly change of declination indicates that south declinations are increasing.

Diff. for 1 Hour, $+9^s.8565$. (Table III.)

AT GREENWICH MEAN NOON.

Day of the Month.	Day of the Year.	THE SUN'S				Logarithm of the Radius Vector of the Earth.	Diff. for 1 Hour.	Mean Tim Sidereal N
		True Longitude.		Diff. for 1 Hour.	Latitude.			
		λ	λ′					
		° ′ ″	′ ″	″	″			h m
1	275	187 55 59.6	55 26.1	147.58	+0.47	0.000 3170	−51.0	11 18 4
2	276	188 55 2.6	54 29.0	147.68	0.52	0.000 1945	51.0	11 14 4
3	277	189 54 8.0	53 34.2	147.77	0.55	0.000 0721	51.0	11 10 5
4	278	190 53 15.7	52 41.8	147.87	+0.54	9.999 9497	−51.0	11 6 5
5	279	191 52 25.8	51 51.8	147.97	0.51	9.999 8271	51.1	11 3
6	280	192 51 38.2	51 4.1	148.07	0.47	9.999 7042	51.2	10 59
7	281	193 50 52.9	50 18.7	148.16	+0.37	9.999 5810	−51.4	10 55
8	282	194 50 9.9	49 35.6	148.26	0.24	9.999 4574	51.6	10 51 1
9	283	195 49 29.1	48 54.7	148.35	+0.11	9.999 3333	51.8	10 47 1
10	284	196 48 50.5	48 15.9	148.44	−0.03	9.999 2086	−52.0	10 43 2
11	285	197 48 13.9	47 39.2	148.52	0.17	9.999 0834	52.2	10 39 2
12	286	198 47 39.3	47 4.5	148.60	0.30	9.998 9578	52.4	10 35 2
13	287	199 47 6.6	46 31.7	148.68	−0.42	9.998 8319	−52.5	10 31 3
14	288	200 46 35.8	46 0.8	148.76	0.49	9.998 7058	52.6	10 27 3
15	289	201 46 6.8	45 31.6	148.83	0.55	9.998 5796	52.6	10 23 4
16	290	202 45 39.6	45 4.3	148.91	−0.59	9.998 4534	−52.5	10 19 4
17	291	203 45 14.2	44 38.8	148.98	0.60	9.998 3275	52.4	10 15 5
18	292	204 44 50.5	44 15.0	149.05	0.58	9.998 2020	52.2	10 11 5
19	293	205 44 28.6	43 53.0	149.11	−0.53	9.998 0770	−51.9	10 7 5
20	294	206 44 8.4	43 32.7	149.19	0.46	9.997 9527	51.6	10 4
21	295	207 43 50.0	43 14.2	149.27	0.35	9.997 8292	51.3	10 0
22	296	208 43 33.5	42 57.4	149.35	−0.23	9.997 7065	−50.9	9 56 1
23	297	209 43 18.7	42 42.5	149.42	−0.11	9.997 5849	50.4	9 52 1
24	298	210 43 5.7	42 29.5	149.50	+0.02	9.997 4644	50.0	9 48 1
25	299	211 42 54.6	42 18.3	149.58	+0.15	9.997 3452	−49.5	9 44 2
26	300	212 42 45.5	42 9.0	149.66	0.27	9.997 2273	48.9	9 40 2
27	301	213 42 38.3	42 1.7	149.74	0.39	9.997 1107	48.3	9 36 3
28	302	214 42 33.2	41 56.4	149.83	+0.48	9.996 9955	−47.7	9 32 3
29	303	215 42 30.1	41 53.1	149.92	0.56	9.996 8818	47.1	9 28 3
30	304	216 42 29.1	41 52.0	150.01	0.60	9.996 7694	46.6	9 24 4
31	305	217 42 30.3	41 53.1	150.10	0.60	9.996 6582	46.1	9 20 4
32	306	218 42 33.7	41 56.3	150.19	+0.59	9.996 5482	−45.6	9 16 5

NOTE.—The longitudes in the column λ are referred to the true equinox of their own date, while those in the column λ′ are referred to the mean equinox of the beginning of the Besselian *fictitious year*.

Diff. for 1 H
$-9^{s}.8296$
(Table I

GREENWICH MEAN TIME.

Day of the Month.	THE MOON'S								
	SEMIDIAMETER.		HORIZONTAL PARALLAX.				UPPER TRANSIT.		AGE.
	Noon.	Midnight.	Noon.	Diff. for 1 Hour.	Midnight.	Diff. for 1 Hour.	Meridian of Greenwich.	Diff. for 1 Hour.	Noon.
	′ ″	′ ″	′ ″	″	′ ″	″	h m	m	d
1	15 44.9	15 49.1	57 41.9	+1.29	57 57.4	+1.29	16 18.9	2.46	20.3
2	15 53.3	15 57.5	58 12.8	1.28	58 28.1	1.26	17 19.5	2.57	21.3
3	16 1.6	16 5.5	58 43.1	1.23	58 57.6	1.18	18 21.4	2.57	22.3
4	16 9.3	16 12.8	59 11.4	+1.11	59 24.3	+1.02	19 22.0	2.48	23.3
5	16 15.9	16 18.6	59 35.9	0.90	59 45.8	0.75	20 19.8	2.33	24.3
6	16 20.8	16 22.4	59 53.8	0.57	59 59.5	+0.37	21 14.0	2.19	25.3
7	16 23.2	16 23.3	60 2.5	+0.14	60 2.7	−0.11	22 5.1	2.08	26.3
8	16 22.5	16 20.8	59 59.8	−0.37	59 53.8	0.64	22 54.2	2.02	27.3
9	16 18.3	16 15.0	59 44.6	0.90	59 32.3	1.15	23 42.6	2.02	28.3
10	16 10.8	16 6.0	59 17.1	−1.38	58 59.3	−1.58	6	. .	29.3
11	16 0.5	15 54.6	58 39.3	1.75	58 17.5	1.88	0 31.4	2.05	0.9
12	15 48.3	15 41.8	57 54.5	1.96	57 30.7	2.00	1 21.5	2.13	1.9
13	15 35.3	15 28.8	57 6.6	−2.00	56 42.8	−1.96	2 13.5	2.20	2.9
14	15 22.5	15 16.5	56 19.7	1.89	55 57.6	1.78	3 7.1	2.26	3.9
15	15 10.8	15 5.7	55 37.0	1.64	55 18.2	1.48	4 1.5	2.27	4.9
16	15 1.2	14 57.2	55 1.5	−1.30	54 47.0	−1.11	4 55.4	2.21	5.9
17	14 53.9	14 51.4	54 34.9	0.90	54 25.4	0.69	5 47.4	2.12	6.9
18	14 49.5	14 48.3	54 18.5	0.47	54 14.2	−0.25	6 36.7	1.99	7.9
19	14 47.8	14 48.0	54 12.5	−0.04	54 13.3	+0.17	7 22.9	1.87	8.9
20	14 48.9	14 50.5	54 16.6	+0.37	54 22.3	0.56	8 6.6	1.77	9.9
21	14 52.6	14 55.3	54 30.1	0.74	54 39.9	0.90	8 48.3	1.71	10.9
22	14 58.5	15 2.1	54 51.5	+1.04	55 4.7	+1.16	9 29.1	1.69	11.9
23	15 6.0	15 10.2	55 19.2	1.25	55 34.7	1.33	10 9.8	1.71	12.9
24	15 14.7	15 19.3	55 51.0	1.38	56 7.8	1.41	10 51.8	1.79	13.9
25	15 23.9	15 28.5	56 24.8	+1.42	56 41.8	+1.40	11 36.1	1.91	14.9
26	15 33.0	15 37.4	56 58.4	1.37	57 14.5	1.32	12 24.0	2.08	15.9
27	15 41.6	15 45.6	57 29.9	1.25	57 44.5	1.17	13 16.2	2.27	16.9
28	15 49.3	15 52.7	57 58.1	+1.09	58 10.6	+1.00	14 13.1	2.46	17.9
29	15 55.8	15 58.6	58 22.0	0.91	58 32.4	0.82	15 13.6	2.57	18.9
30	16 1.2	16 3.4	58 41.6	0.72	58 49.7	0.63	16 15.6	2.58	19.9
31	16 5.3	16 6.9	58 56.8	0.55	59 2.8	0.46	17 16.4	2.48	20.9
32	16 8.3	16 9.4	59 7.8	+0.37	59 11.8	+0.28	18 14.2	2.33	21.9

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	TUESDAY 1.					THURSDAY 3.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	4 20 31.46	2.4305	N.25 53 44.1	7.373	0	6 23 15.64	2.6367	N.28 35 31.2	1.001
1	4 22 57.49	2.4372	26 1 2.0	7.225	1	6 25 53.87	2.6376	28 34 25.4	1.193
2	4 25 23.92	2.4438	26 8 11.1	7.077	2	6 28 32.15	2.6383	28 33 8.1	1.385
3	4 27 50.75	2.4504	26 15 11.2	6.926	3	6 31 10.47	2.6388	28 31 39.2	1.577
4	4 30 17.97	2.4569	26 22 2.2	6.773	4	6 33 48.81	2.6393	28 29 58.8	1.770
5	4 32 45.58	2.4633	26 28 44.0	6.620	5	6 36 27.18	2.6396	28 28 6.8	1.962
6	4 35 13.57	2.4697	26 35 16.6	6.466	6	6 39 5.56	2.6397	28 26 3.3	2.154
7	4 37 41.94	2.4759	26 41 39.9	6.310	7	6 41 43.94	2.6396	28 23 48.3	2.347
8	4 40 10.68	2.4821	26 47 53.8	6.152	8	6 44 22.31	2.6393	28 21 21.7	2.539
9	4 42 39.79	2.4882	26 53 58.1	5.993	9	6 47 0.66	2.6389	28 18 43.6	2.732
10	4 45 9.27	2.4943	26 59 52.9	5.833	10	6 49 38.98	2.6384	28 15 53.9	2.923
11	4 47 39.11	2.5003	27 5 38.1	5.672	11	6 52 17.27	2.6377	28 12 52.8	3.115
12	4 50 9.31	2.5062	27 11 13.6	5.509	12	6 54 55.51	2.6368	28 9 40.1	3.307
13	4 52 39.86	2.5120	27 16 39.2	5.345	13	6 57 33.69	2.6358	28 6 15.9	3.499
14	4 55 10.75	2.5177	27 21 55.0	5.180	14	7 0 11.81	2.6347	28 2 40.2	3.690
15	4 57 41.98	2.5233	27 27 0.8	5.013	15	7 2 49.85	2.6333	27 58 53.1	3.880
16	5 0 13.55	2.5288	27 31 56.6	4.846	16	7 5 27.81	2.6318	27 54 54.6	4.071
17	5 2 45.44	2.5342	27 36 42.3	4.678	17	7 8 5.67	2.6302	27 50 44.6	4.261
18	5 5 17.65	2.5395	27 41 17.9	4.508	18	7 10 43.43	2.6284	27 46 23.3	4.450
19	5 7 50.18	2.5447	27 45 43.2	4.336	19	7 13 21.08	2.6265	27 41 50.6	4.640
20	5 10 23.01	2.5498	27 49 58.2	4.164	20	7 15 58.61	2.6245	27 37 6.5	4.828
21	5 12 56.15	2.5547	27 54 2.9	3.991	21	7 18 36.02	2.6223	27 32 11.2	5.015
22	5 15 29.58	2.5595	27 57 57.1	3.817	22	7 21 13.29	2.6200	27 27 4.6	5.204
23	5 18 3.29	2.5643	N.28 1 40.9	3.642	23	7 23 50.42	2.6175	N.27 21 46.7	5.391
	WEDNESDAY 2.					FRIDAY 4.			
0	5 20 37.29	2.5689	N.28 5 14.1	3.464	0	7 26 27.39	2.6148	N.27 16 17.7	5.577
1	5 23 11.56	2.5733	28 8 36.6	3.287	1	7 29 4.20	2.6121	27 10 37.5	5.763
2	5 25 46.09	2.5777	28 11 48.5	3.109	2	7 31 40.84	2.6093	27 4 46.2	5.948
3	5 28 20.88	2.5818	28 14 49.7	2.929	3	7 34 17.31	2.6063	26 58 43.8	6.132
4	5 30 55.91	2.5859	28 17 40.0	2.748	4	7 36 53.59	2.6031	26 52 30.4	6.314
5	5 33 31.19	2.5899	28 20 19.5	2.567	5	7 39 29.68	2.5998	26 46 6.1	6.497
6	5 36 6.70	2.5937	28 22 48.1	2.386	6	7 42 5.57	2.5965	26 39 30.8	6.678
7	5 38 42.43	2.5973	28 25 5.8	2.203	7	7 44 41.26	2.5930	26 32 44.7	6.859
8	5 41 18.38	2.6009	28 27 12.5	2.019	8	7 47 16.73	2.5893	26 25 47.7	7.039
9	5 43 54.54	2.6043	28 29 8.1	1.834	9	7 49 51.98	2.5857	26 18 40.0	7.217
10	5 46 30.89	2.6075	28 30 52.6	1.649	10	7 52 27.01	2.5819	26 11 21.6	7.395
11	5 49 7.44	2.6107	28 32 26.0	1.463	11	7 55 1.81	2.5780	26 3 52.6	7.572
12	5 51 44.17	2.6136	28 33 48.2	1.277	12	7 57 36.37	2.5739	25 56 12.9	7.748
13	5 54 21.07	2.6163	28 34 59.2	1.089	13	8 0 10.68	2.5698	25 48 22.8	7.923
14	5 56 58.13	2.6189	28 35 58.9	0.902	14	8 2 44.75	2.5657	25 40 22.2	8.097
15	5 59 35.34	2.6214	28 36 47.4	0.714	15	8 5 18.56	2.5613	25 32 11.2	8.269
16	6 2 12.70	2.6238	28 37 24.6	0.525	16	8 7 52.11	2.5569	25 23 49.9	8.441
17	6 4 50.20	2.6260	28 37 50.4	0.335	17	8 10 25.39	2.5524	25 15 18.3	8.611
18	6 7 27.82	2.6279	28 38 4.8	+0.145	18	8 12 58.40	2.5478	25 6 36.6	8.779
19	6 10 5.55	2.6298	28 38 7.8	−0.045	19	8 15 31.13	2.5432	24 57 44.8	8.947
20	6 12 43.39	2.6315	28 37 59.4	0.235	20	8 18 3.58	2.5384	24 48 42.9	9.115
21	6 15 21.33	2.6331	28 37 39.6	0.426	21	8 20 35.74	2.5337	24 39 31.0	9.280
22	6 17 59.36	2.6345	28 37 8.3	0.617	22	8 23 7.62	2.5288	24 30 9.3	9.443
23	6 20 37.47	2.6357	28 36 25.5	0.809	23	8 25 39.20	2.5238	24 20 37.8	9.606
24	6 23 15.64	2.6367	N.28 35 31.2	1.001	24	8 28 10.48	2.5188	N.24 10 56.6	9.767

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	SATURDAY 5.					MONDAY 7.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	8 28 10.48	2.5188	N.24 10 56.6	9.767	0	10 22 50.76	2.2625	N.13 45 54.2	15.623
1	8 30 41.46	2.5138	24 1 5.8	9.927	1	10 25 6.37	2.2578	13 30 14.5	15.701
2	8 33 12.13	2.5087	23 51 5.4	10.086	2	10 27 21.70	2.2532	13 14 30.1	15.778
3	8 35 42.50	2.5036	23 40 55.5	10.243	3	10 29 36.75	2.2486	12 58 41.1	15.854
4	8 38 12.56	2.4983	23 30 36.3	10.398	4	10 31 51.53	2.2442	12 42 47.6	15.927
5	8 40 42.30	2.4930	23 20 7.7	10.552	5	10 34 6.05	2.2397	12 26 49.8	15.998
6	8 43 11.72	2.4877	23 9 30.0	10.705	6	10 36 20.30	2.2353	12 10 47.8	16.068
7	8 45 40.82	2.4823	22 58 43.1	10.857	7	10 38 34.29	2.2311	11 54 41.7	16.136
8	8 48 9.60	2.4769	22 47 47.2	11.007	8	10 40 48.03	2.2268	11 38 31.5	16.202
9	8 50 38.05	2.4714	22 36 42.3	11.155	9	10 43 1.51	2.2227	11 22 17.4	16.266
10	8 53 6.17	2.4660	22 25 28.6	11.302	10	10 45 14.75	2.2186	11 5 59.5	16.328
11	8 55 33.97	2.4606	22 14 6.1	11.447	11	10 47 27.74	2.2145	10 49 38.0	16.389
12	8 58 1.44	2.4551	22 2 35.0	11.590	12	10 49 40.49	2.2106	10 33 12.9	16.448
13	9 0 28.58	2.4495	21 50 55.3	11.732	13	10 51 53.01	2.2067	10 16 44.3	16.504
14	9 2 55.38	2.4439	21 39 7.1	11.872	14	10 54 5.29	2.2028	10 0 12.4	16.559
15	9 5 21.85	2.4384	21 27 10.6	12.011	15	10 56 17.35	2.1992	9 43 37.2	16.612
16	9 7 47.99	2.4328	21 15 5.8	12.148	16	10 58 29.19	2.1955	9 26 58.9	16.663
17	9 10 13.79	2.4273	21 2 52.8	12.284	17	11 0 40.81	2.1919	9 10 17.6	16.713
18	9 12 39.26	2.4217	20 50 31.7	12.418	18	11 2 52.22	2.1883	8 53 33.4	16.761
19	9 15 4.39	2.4160	20 38 2.6	12.550	19	11 5 3.41	2.1848	8 36 46.3	16.807
20	9 17 29.18	2.4104	20 25 25.7	12.680	20	11 7 14.40	2.1816	8 19 56.5	16.851
21	9 19 53.64	2.4048	20 12 41.0	12.809	21	11 9 25.20	2.1783	8 3 4.2	16.893
22	9 22 17.76	2.3992	19 59 48.6	12.937	22	11 11 35.79	2.1750	7 46 9.4	16.933
23	9 24 41.54	2.3936	N.19 46 48.6	13.063	23	11 13 46.20	2.1719	N. 7 29 12.2	16.972
	SUNDAY 6.					TUESDAY 8.			
0	9 27 4.99	2.3880	N.19 33 41.1	13.186	0	11 15 56.42	2.1688	N. 7 12 12.7	17.009
1	9 29 28.10	2.3824	19 20 26.3	13.308	1	11 18 6.46	2.1658	6 55 11.1	17.043
2	9 31 50.88	2.3769	19 7 4.2	13.428	2	11 20 16.32	2.1629	6 38 7.5	17.077
3	9 34 13.33	2.3713	18 53 34.9	13.547	3	11 22 26.01	2.1601	6 21 1.9	17.108
4	9 36 35.44	2.3658	18 39 58.6	13.663	4	11 24 35.53	2.1573	6 3 54.6	17.137
5	9 38 57.22	2.3603	18 26 15.3	13.778	5	11 26 44.89	2.1547	5 46 45.5	17.165
6	9 41 18.67	2.3548	18 12 25.2	13.892	6	11 28 54.09	2.1521	5 29 34.8	17.191
7	9 43 39.80	2.3494	17 58 28.3	14.003	7	11 31 3.14	2.1496	5 12 22.6	17.215
8	9 46 0.60	2.3440	17 44 24.8	14.113	8	11 33 12.04	2.1472	4 55 9.0	17.237
9	9 48 21.08	2.3386	17 30 14.8	14.221	9	11 35 20.80	2.1448	4 37 54.1	17.258
10	9 50 41.23	2.3332	17 15 58.3	14.328	10	11 37 29.42	2.1425	4 20 38.0	17.277
11	9 53 1.06	2.3278	17 1 35.5	14.432	11	11 39 37.90	2.1403	4 3 20.9	17.293
12	9 55 20.57	2.3225	16 47 6.5	14.534	12	11 41 46.25	2.1382	3 46 2.8	17.309
13	9 57 39.76	2.3173	16 32 31.4	14.635	13	11 43 54.48	2.1362	3 28 43.8	17.323
14	9 59 58.64	2.3121	16 17 50.3	14.733	14	11 46 2.59	2.1343	3 11 24.1	17.334
15	10 2 17.21	2.3069	16 3 3.4	14.830	15	11 48 10.59	2.1324	2 54 3.7	17.344
16	10 4 35.47	2.3018	15 48 10.7	14.926	16	11 50 18.48	2.1306	2 36 42.8	17.352
17	10 6 53.43	2.2967	15 33 12.3	15.019	17	11 52 26.26	2.1288	2 19 21.5	17.358
18	10 9 11.08	2.2917	15 18 8.4	15.111	18	11 54 33.94	2.1272	2 1 59.8	17.363
19	10 11 28.43	2.2867	15 2 59.0	15.201	19	11 56 41.53	2.1257	1 44 37.9	17.366
20	10 13 45.48	2.2818	14 47 44.3	15.289	20	11 58 49.03	2.1242	1 27 15.9	17.367
21	10 16 2.24	2.2768	14 32 24.3	15.376	21	12 0 56.44	2.1228	1 9 53.9	17.367
22	10 18 18.70	2.2719	14 16 59.2	15.459	22	12 3 3.77	2.1216	0 52 31.9	17.365
23	10 20 34.87	2.2672	14 1 29.1	15.542	23	12 5 11.03	2.1204	0 35 10.1	17.360
24	10 22 50.76	2.2625	N.13 45 54.2	15.623	24	12 7 18.22	2.1193	N. 0 17 48.7	17.354

OCTOBER, 1912.

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.
	WEDNESDAY 9.					FRIDAY 11.		
	h m s	s	° ′ ″	″		h m s	s	° ′ ″
0	12 7 18.22	2.1193	N. 0 17 48.7	17.354	0	13 49 9.37	2.1511	S. 12 57 17.4
1	12 9 25.34	2.1182	N. 0 0 27.6	17.347	1	13 51 18.50	2.1533	13 12 25.3
2	12 11 32.40	2.1172	S. 0 16 52.9	17.338	2	13 53 27.76	2.1555	13 27 28.1
3	12 13 39.41	2.1163	0 34 12.9	17.327	3	13 55 37.16	2.1578	13 42 25.9
4	12 15 46.36	2.1155	0 51 32.2	17.314	4	13 57 46.69	2.1601	13 57 18.6
5	12 17 53.27	2.1147	1 8 50.6	17.300	5	13 59 56.37	2.1625	14 12 6.0
6	12 20 0.13	2.1140	1 26 8.1	17.284	6	14 2 6.19	2.1648	14 26 48.1
7	12 22 6.95	2.1134	1 43 24.7	17.267	7	14 4 16.15	2.1673	14 41 24.8
8	12 24 13.74	2.1130	2 0 40.2	17.248	8	14 6 26.26	2.1698	14 55 56.0
9	12 26 20.51	2.1126	2 17 54.5	17.227	9	14 8 36.53	2.1724	15 10 21.7
10	12 28 27.25	2.1122	2 35 7.4	17.204	10	14 10 46.95	2.1749	15 24 41.7
11	12 30 33.97	2.1119	2 52 18.9	17.179	11	14 12 57.52	2.1775	15 38 56.0
12	12 32 40.68	2.1117	3 9 28.9	17.153	12	14 15 8.25	2.1801	15 53 4.6
13	12 34 47.38	2.1116	3 26 37.3	17.126	13	14 17 19.14	2.1828	16 7 7.3
14	12 36 54.07	2.1116	3 43 44.0	17.097	14	14 19 30.19	2.1856	16 21 4.1
15	12 39 0.77	2.1117	4 0 48.9	17.066	15	14 21 41.41	2.1883	16 34 54.8
16	12 41 7.47	2.1118	4 17 51.9	17.033	16	14 23 52.79	2.1910	16 48 39.5
17	12 43 14.18	2.1120	4 34 52.9	16.999	17	14 26 4.33	2.1938	17 2 18.0
18	12 45 20.91	2.1122	4 51 51.8	16.963	18	14 28 16.04	2.1967	17 15 50.2
19	12 47 27.65	2.1125	5 8 48.5	16.926	19	14 30 27.93	2.1995	17 29 16.2
20	12 49 34.41	2.1129	5 25 42.9	16.887	20	14 32 39.98	2.2023	17 42 35.8
21	12 51 41.20	2.1134	5 42 34.9	16.847	21	14 34 52.20	2.2052	17 55 48.9
22	12 53 48.02	2.1140	5 59 24.5	16.805	22	14 37 4.60	2.2081	18 8 55.5
23	12 55 54.88	2.1146	S. 6 16 11.5	16.761	23	14 39 17.17	2.2109	S. 18 21 55.5
	THURSDAY 10.					SATURDAY 12.		
0	12 58 1.77	2.1153	S. 6 32 55.8	16.715	0	14 41 29.91	2.2138	S. 18 34 48.9
1	13 0 8.71	2.1160	6 49 37.3	16.668	1	14 43 42.83	2.2168	18 47 35.5
2	13 2 15.69	2.1168	7 6 16.0	16.620	2	14 45 55.93	2.2198	19 0 15.3
3	13 4 22.73	2.1177	7 22 51.7	16.570	3	14 48 9.20	2.2227	19 12 48.3
4	13 6 29.82	2.1187	7 39 24.4	16.518	4	14 50 22.65	2.2257	19 25 14.3
5	13 8 36.98	2.1198	7 55 53.9	16.465	5	14 52 36.28	2.2286	19 37 33.3
6	13 10 44.20	2.1209	8 12 20.2	16.410	6	14 54 50.08	2.2316	19 49 45.3
7	13 12 51.49	2.1221	8 28 43.1	16.353	7	14 57 4.07	2.2346	20 1 50.1
8	13 14 58.85	2.1233	8 45 2.6	16.297	8	14 59 18.23	2.2375	20 13 47.8
9	13 17 6.28	2.1245	9 1 18.7	16.238	9	15 1 32.57	2.2405	20 25 38.2
10	13 19 13.79	2.1259	9 17 31.1	16.176	10	15 3 47.09	2.2435	20 37 21.2
11	13 21 21.39	2.1274	9 33 39.8	16.114	11	15 6 1.79	2.2465	20 48 56.9
12	13 23 29.08	2.1289	9 49 44.8	16.051	12	15 8 16.67	2.2495	21 0 25.2
13	13 25 36.86	2.1304	10 5 45.9	15.985	13	15 10 31.73	2.2524	21 11 46.0
14	13 27 44.73	2.1319	10 21 43.0	15.918	14	15 12 46.96	2.2553	21 22 59.2
15	13 29 52.69	2.1336	10 37 36.1	15.851	15	15 15 2.37	2.2583	21 34 4.8
16	13 32 0.76	2.1354	10 53 25.1	15.781	16	15 17 17.96	2.2613	21 45 2.7
17	13 34 8.94	2.1372	11 9 9.8	15.709	17	15 19 33.72	2.2642	21 55 52.9
18	13 36 17.22	2.1389	11 24 50.2	15.637	18	15 21 49.66	2.2671	22 6 35.4
19	13 38 25.61	2.1408	11 40 26.2	15.563	19	15 24 5.77	2.2699	22 17 10.0
20	13 40 34.12	2.1428	11 55 57.7	15.488	20	15 26 22.05	2.2728	22 27 36.7
21	13 42 42.75	2.1448	12 11 24.7	15.411	21	15 28 38.51	2.2757	22 37 55.5
22	13 44 51.50	2.1468	12 26 47.0	15.333	22	15 30 55.13	2.2784	22 48 6.3
23	13 47 0.37	2.1489	12 42 4.6	15.253	23	15 33 11.92	2.2812	22 58 9.1
24	13 49 9.37	2.1511	S. 12 57 17.4	15.172	24	15 35 28.87	2.2839	S. 23 8 3.7

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	SUNDAY 13.					TUESDAY 15.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	15 35 28.87	2.2839	S. 23 8 3.7	9.843	0	17 27 19.94	2.3503	S. 28 13 14.3	2.728
1	15 37 45.99	2.2867	23 17 50.2	9.707	1	17 29 40.94	2.3497	28 15 53.4	2.575
2	15 40 3.27	2.2894	23 27 28.5	9.570	2	17 32 1.90	2.3490	28 18 23.3	2.422
3	15 42 20.72	2.2921	23 36 58.6	9.432	3	17 34 22.82	2.3483	28 20 44.0	2.268
4	15 44 38.32	2.2946	23 46 20.4	9.294	4	17 36 43.70	2.3476	28 22 55.5	2.115
5	15 46 56.07	2.2972	23 55 33.9	9.155	5	17 39 4.53	2.3467	28 24 57.8	1.962
6	15 49 13.98	2.2998	24 4 39.0	9.015	6	17 41 25.30	2.3456	28 26 50.9	1.809
7	15 51 32.05	2.3023	24 13 35.7	8.874	7	17 43 46.00	2.3445	28 28 34.9	1.657
8	15 53 50.26	2.3048	24 22 23.9	8.733	8	17 46 6.64	2.3434	28 30 9.7	1.504
9	15 56 8.62	2.3072	24 31 3.7	8.592	9	17 48 27.21	2.3421	28 31 35.4	1.352
10	15 58 27.12	2.3095	24 39 34.9	8.449	10	17 50 47.70	2.3407	28 32 51.9	1.200
11	16 0 45.76	2.3118	24 47 57.6	8.306	11	17 53 8.10	2.3393	28 33 59.4	1.049
12	16 3 4.54	2.3141	24 56 11.6	8.162	12	17 55 28.42	2.3378	28 34 57.8	0.898
13	16 5 23.45	2.3163	25 4 17.0	8.018	13	17 57 48.64	2.3362	28 35 47.1	0.747
14	16 7 42.50	2.3186	25 12 13.7	7.873	14	18 0 8.76	2.3344	28 36 27.4	0.596
15	16 10 1.68	2.3207	25 20 1.7	7.727	15	18 2 28.77	2.3327	28 36 58.6	0.445
16	16 12 20.98	2.3227	25 27 40.9	7.580	16	18 4 48.68	2.3308	28 37 20.8	0.295
17	16 14 40.40	2.3247	25 35 11.3	7.433	17	18 7 8.47	2.3288	28 37 34.0	−0.146
18	16 16 59.94	2.3266	25 42 32.9	7.287	18	18 9 28.14	2.3267	28 37 38.3	+0.003
19	16 19 19.59	2.3285	25 49 45.7	7.139	19	18 11 47.68	2.3246	28 37 33.7	0.152
20	16 21 39.36	2.3303	25 56 49.6	6.991	20	18 14 7.09	2.3224	28 37 20.1	0.301
21	16 23 59.23	2.3320	26 3 44.6	6.842	21	18 16 26.37	2.3202	28 36 57.6	0.449
22	16 26 19.20	2.3337	26 10 30.7	6.693	22	18 18 45.51	2.3178	28 36 26.2	0.597
23	16 28 39.28	2.3354	S. 26 17 7.8	6.543	23	18 21 4.50	2.3153	S. 28 35 46.0	0.743
	MONDAY 14.					WEDNESDAY 16.			
0	16 30 59.45	2.3369	S. 26 23 35.9	6.393	0	18 23 23.34	2.3127	S. 28 34 57.0	0.890
1	16 33 19.71	2.3383	26 29 55.0	6.243	1	18 25 42.02	2.3100	28 33 59.2	1.036
2	16 35 40.05	2.3397	26 36 5.1	6.093	2	18 28 0.54	2.3073	28 32 52.7	1.182
3	16 38 0.48	2.3411	26 42 6.2	5.942	3	18 30 18.90	2.3046	28 31 37.4	1.327
4	16 40 20.98	2.3423	26 47 58.2	5.791	4	18 32 37.09	2.3018	28 30 13.5	1.471
5	16 42 41.56	2.3436	26 53 41.1	5.639	5	18 34 55.11	2.2988	28 28 40.9	1.615
6	16 45 2.21	2.3447	26 59 14.9	5.488	6	18 37 12.94	2.2957	28 26 59.7	1.758
7	16 47 22.92	2.3457	27 4 39.6	5.336	7	18 39 30.59	2.2927	28 25 9.9	1.901
8	16 49 43.69	2.3466	27 9 55.2	5.183	8	18 41 48.06	2.2895	28 23 11.6	2.043
9	16 52 4.51	2.3474	27 15 1.6	5.031	9	18 44 5.33	2.2863	28 21 4.7	2.186
10	16 54 25.38	2.3483	27 19 58.9	4.878	10	18 46 22.41	2.2830	28 18 49.3	2.327
11	16 56 46.30	2.3490	27 24 47.0	4.725	11	18 48 39.29	2.2796	28 16 25.5	2.467
12	16 59 7.26	2.3496	27 29 25.9	4.572	12	18 50 55.96	2.2762	28 13 53.3	2.607
13	17 1 28.25	2.3501	27 33 55.6	4.418	13	18 53 12.43	2.2727	28 11 12.7	2.746
14	17 3 49.27	2.3505	27 38 16.1	4.265	14	18 55 28.68	2.2691	28 8 23.8	2.884
15	17 6 10.32	2.3509	27 42 27.4	4.112	15	18 57 44.72	2.2655	28 5 26.6	3.022
16	17 8 31.38	2.3512	27 46 29.5	3.958	16	19 0 0.54	2.2618	28 2 21.1	3.160
17	17 10 52.46	2.3513	27 50 22.4	3.805	17	19 2 16.13	2.2580	27 59 7.4	3.296
18	17 13 13.54	2.3514	27 54 6.1	3.651	18	19 4 31.50	2.2542	27 55 45.6	3.432
19	17 15 34.63	2.3515	27 57 40.5	3.497	19	19 6 46.64	2.2503	27 52 15.6	3.567
20	17 17 55.72	2.3514	28 1 5.7	3.343	20	19 9 1.54	2.2464	27 48 37.6	3.701
21	17 20 16.80	2.3512	28 4 21.7	3.189	21	19 11 16.21	2.2425	27 44 51.5	3.835
22	17 22 37.86	2.3509	28 7 28.4	3.036	22	19 13 30.64	2.2385	27 40 57.4	3.968
23	17 24 58.91	2.3507	28 10 26.0	2.882	23	19 15 44.83	2.2344	27 36 55.4	4.100
24	17 27 19.94	2.3503	S. 28 13 14.3	2.728	24	19 17 58.77	2.2303	S. 27 32 45.4	4.232

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
THURSDAY 17.					SATURDAY 19.				
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	19 17 58.77	2.2303	S.27 32 45.4	4.232	0	20 59 48.02	2.0098	S.21 53 24.6	9.589
1	19 20 12.47	2.2262	27 28 27.6	4.362	1	21 1 48.48	2.0054	21 43 46.5	9.681
2	19 22 25.91	2.2219	27 24 1.9	4.492	2	21 3 48.67	2.0010	21 34 2.9	9.772
3	19 24 39.10	2.2177	27 19 28.5	4.621	3	21 5 48.60	1.9966	21 24 13.9	9.861
4	19 26 52.03	2.2134	27 14 47.4	4.750	4	21 7 48.26	1.9923	21 14 19.6	9.950
5	19 29 4.71	2.2091	27 9 58.5	4.878	5	21 9 47.67	1.9880	21 4 19.9	10.038
6	19 31 17.12	2.2047	27 5 2.0	5.004	6	21 11 46.82	1.9837	20 54 15.0	10.125
7	19 33 29.27	2.2003	26 59 58.0	5.130	7	21 13 45.71	1.9794	20 44 4.9	10.211
8	19 35 41.16	2.1959	26 54 46.4	5.256	8	21 15 44.35	1.9752	20 33 49.7	10.297
9	19 37 52.78	2.1914	26 49 27.3	5.381	9	21 17 42.73	1.9710	20 23 29.3	10.382
10	19 40 4.13	2.1869	26 44 0.7	5.504	10	21 19 40.87	1.9669	20 13 3.8	10.466
11	19 42 15.21	2.1824	26 38 26.8	5.627	11	21 21 38.76	1.9628	20 2 33.4	10.548
12	19 44 26.02	2.1779	26 32 45.5	5.749	12	21 23 36.40	1.9587	19 51 58.0	10.631
13	19 46 36.56	2.1733	26 26 56.9	5.870	13	21 25 33.80	1.9547	19 41 17.7	10.713
14	19 48 46.82	2.1687	26 21 1.1	5.990	14	21 27 30.96	1.9507	19 30 32.5	10.794
15	19 50 56.80	2.1640	26 14 58.1	6.110	15	21 29 27.88	1.9467	19 19 42.4	10.874
16	19 53 6.50	2.1594	26 8 47.9	6.229	16	21 31 24.57	1.9428	19 8 47.6	10.953
17	19 55 15.93	2.1548	26 2 30.6	6.347	17	21 33 21.02	1.9389	18 57 48.1	11.031
18	19 57 25.08	2.1502	25 56 6.2	6.465	18	21 35 17.24	1.9352	18 46 43.9	11.109
19	19 59 33.95	2.1454	25 49 34.8	6.581	19	21 37 13.24	1.9314	18 35 35.0	11.186
20	20 1 42.53	2.1407	25 42 56.5	6.696	20	21 39 9.01	1.9277	18 24 21.6	11.262
21	20 3 50.83	2.1360	25 36 11.3	6.810	21	21 41 4.56	1.9240	18 13 3.6	11.538
22	20 5 58.85	2.1313	25 29 19.3	6.924	22	21 42 59.89	1.9203	18 1 41.1	11.413
23	20 8 6.59	2.1266	S.25 22 20.4	7.037	23	21 44 55.00	1.9167	S.17 50 14.1	11.486
FRIDAY 18.					SUNDAY 20.				
0	20 10 14.04	2.1218	S.25 15 14.8	7.149	0	21 46 49.90	1.9132	S.17 38 42.8	11.558
1	20 12 21.21	2.1171	25 8 2.5	7.261	1	21 48 44.59	1.9097	17 27 7.1	11.631
2	20 14 28.09	2.1123	25 0 43.5	7.372	2	21 50 39.07	1.9062	17 15 27.1	11.703
3	20 16 34.68	2.1075	24 53 17.9	7.481	3	21 52 33.34	1.9028	17 3 42.8	11.773
4	20 18 40.99	2.1028	24 45 45.8	7.589	4	21 54 27.41	1.8996	16 51 54.3	11.843
5	20 20 47.02	2.0981	24 38 7.2	7.697	5	21 56 21.29	1.8963	16 40 1.6	11.913
6	20 22 52.76	2.0933	24 30 22.1	7.805	6	21 58 14.97	1.8930	16 28 4.8	11.981
7	20 24 58.22	2.0886	24 22 30.6	7.912	7	22 0 8.45	1.8898	16 16 3.9	12.048
8	20 27 3.39	2.0838	24 14 32.7	8.017	8	22 2 1.75	1.8867	16 3 59.0	12.115
9	20 29 8.28	2.0792	24 6 28.6	8.121	9	22 3 54.86	1.8837	15 51 50.1	12.182
10	20 31 12.89	2.0744	23 58 18.2	8.225	10	22 5 47.79	1.8807	15 39 37.2	12.247
11	20 33 17.21	2.0697	23 50 1.6	8.327	11	22 7 40.54	1.8777	15 27 20.5	12.311
12	20 35 21.25	2.0650	23 41 38.9	8.429	12	22 9 33.11	1.8748	15 14 59.9	12.375
13	20 37 25.01	2.0603	23 33 10.1	8.531	13	22 11 25.51	1.8719	15 2 35.5	12.438
14	20 39 28.48	2.0556	23 24 35.2	8.632	14	22 13 17.74	1.8691	14 50 7.3	12.501
15	20 41 31.68	2.0510	23 15 54.3	8.732	15	22 15 9.80	1.8663	14 37 35.4	12.563
16	20 43 34.60	2.0463	23 7 7.4	8.830	16	22 17 1.70	1.8637	14 24 59.8	12.624
17	20 45 37.24	2.0417	22 58 14.7	8.927	17	22 18 53.45	1.8612	14 12 20.5	12.684
18	20 47 39.60	2.0371	22 49 16.2	9.024	18	22 20 45.04	1.8585	13 59 37.7	12.743
19	20 49 41.69	2.0325	22 40 11.8	9.122	19	22 22 36.47	1.8560	13 46 51.4	12.802
20	20 51 43.50	2.0278	22 31 1.6	9.217	20	22 24 27.76	1.8536	13 34 1.5	12.860
21	20 53 45.03	2.0233	22 21 45.8	9.311	21	22 26 18.90	1.8512	13 21 8.2	12.917
22	20 55 46.30	2.0189	22 12 24.3	9.405	22	22 28 9.90	1.8488	13 8 11.4	12.974
23	20 57 47.30	2.0143	22 2 57.2	9.498	23	22 30 0.76	1.8466	12 55 11.3	13.030
24	20 59 48.02	2.0098	S.21 53 24.6	9.589	24	22 31 51.49	1.8444	S.12 42 7.8	13.085

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	MONDAY 21.					WEDNESDAY 23.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	22 31 51.49	1.8444	S. 12 42 7.8	13.085	0	23 59 5.78	1.8170	S. 1 24 43.3	14.844
1	22 33 42.09	1.8423	12 29 1.1	13.139	1	0 0 54.83	1.8182	1 9 52.1	14.862
2	22 35 32.56	1.8402	12 15 51.1	13.193	2	0 2 43.96	1.8194	0 54 59.9	14.878
3	22 37 22.91	1.8382	12 2 37.9	13.247	3	0 4 33.16	1.8208	0 40 6.8	14.893
4	22 39 13.14	1.8362	11 49 21.5	13.299	4	0 6 22.45	1.8222	0 25 12.8	14.908
5	22 41 3.26	1.8343	11 36 2.0	13.350	5	0 8 11.82	1.8236	S. 0 10 17.9	14.922
6	22 42 53.26	1.8325	11 22 39.5	13.401	6	0 10 1.28	1.8251	N. 0 4 37.8	14.934
7	22 44 43.16	1.8307	11 9 13.9	13.451	7	0 11 50.83	1.8267	0 19 34.2	14.946
8	22 46 32.95	1.8290	10 55 45.4	13.500	8	0 13 40.48	1.8284	0 34 31.3	14.957
9	22 48 22.64	1.8273	10 42 13.9	13.548	9	0 15 30.24	1.8302	0 49 29.0	14.967
10	22 50 12.23	1.8258	10 28 39.6	13.596	10	0 17 20.11	1.8321	1 4 27.3	14.976
11	22 52 1.73	1.8243	10 15 2.4	13.642	11	0 19 10.09	1.8339	1 19 26.1	14.983
12	22 53 51.15	1.8229	10 1 22.5	13.688	12	0 21 0.18	1.8359	1 34 25.3	14.990
13	22 55 40.48	1.8215	9 47 39.8	13.735	13	0 22 50.40	1.8380	1 49 24.9	14.997
14	22 57 29.73	1.8202	9 33 54.3	13.780	14	0 24 40.74	1.8401	2 4 24.9	15.002
15	22 59 18.91	1.8190	9 20 6.2	13.824	15	0 26 31.21	1.8423	2 19 25.2	15.007
16	23 1 8.01	1.8178	9 6 15.4	13.867	16	0 28 21.82	1.8447	2 34 25.7	15.010
17	23 2 57.04	1.8167	8 52 22.1	13.910	17	0 30 12.57	1.8470	2 49 26.4	15.012
18	23 4 46.01	1.8157	8 38 26.2	13.952	18	0 32 3.46	1.8494	3 4 27.2	15.014
19	23 6 34.92	1.8147	8 24 27.9	13.993	19	0 33 54.50	1.8520	3 19 28.1	15.015
20	23 8 23.77	1.8138	8 10 27.1	14.033	20	0 35 45.70	1.8546	3 34 29.0	15.014
21	23 10 12.57	1.8129	7 56 24.0	14.072	21	0 37 37.05	1.8573	3 49 29.8	15.012
22	23 12 1.32	1.8122	7 42 18.5	14.111	22	0 39 28.57	1.8600	4 4 30.5	15.010
23	23 13 50.03	1.8115	S. 7 28 10.7	14.149	23	0 41 20.25	1.8628	N. 4 19 31.0	15.007
	TUESDAY 22.					THURSDAY 24.			
0	23 15 38.70	1.8108	S. 7 14 0.6	14.187	0	0 43 12.11	1.8657	N. 4 34 31.3	15.003
1	23 17 27.33	1.8103	6 59 48.3	14.223	1	0 45 4.14	1.8687	4 49 31.3	14.997
2	23 19 15.93	1.8098	6 45 33.9	14.258	2	0 46 56.36	1.8718	5 4 30.9	14.989
3	23 21 4.51	1.8093	6 31 17.4	14.293	3	0 48 48.76	1.8749	5 19 30.0	14.982
4	23 22 53.06	1.8090	6 16 58.7	14.328	4	0 50 41.35	1.8782	5 34 28.7	14.973
5	23 24 41.59	1.8088	6 2 38.0	14.361	5	0 52 34.14	1.8814	5 49 26.8	14.963
6	23 26 30.11	1.8086	5 48 15.4	14.393	6	0 54 27.12	1.8847	6 4 24.3	14.953
7	23 28 18.62	1.8084	5 33 50.9	14.425	7	0 56 20.31	1.8882	6 19 21.1	14.941
8	23 30 7.12	1.8083	5 19 24.4	14.457	8	0 58 13.71	1.8918	6 34 17.2	14.927
9	23 31 55.62	1.8083	5 4 56.1	14.487	9	1 0 7.33	1.8954	6 49 12.4	14.913
10	23 33 44.12	1.8084	4 50 26.0	14.516	10	1 2 1.16	1.8990	7 4 6.7	14.898
11	23 35 32.63	1.8085	4 35 54.2	14.545	11	1 3 55.21	1.9028	7 19 0.1	14.882
12	23 37 21.14	1.8087	4 21 20.6	14.573	12	1 5 49.49	1.9066	7 33 52.5	14.864
13	23 39 9.67	1.8090	4 6 45.4	14.600	13	1 7 44.00	1.9105	7 48 43.8	14.845
14	23 40 58.22	1.8094	3 52 8.6	14.626	14	1 9 38.75	1.9145	8 3 33.9	14.824
15	23 42 46.80	1.8098	3 37 30.3	14.652	15	1 11 33.74	1.9185	8 18 22.7	14.803
16	23 44 35.40	1.8103	3 22 50.4	14.677	16	1 13 28.97	1.9226	8 33 10.3	14.782
17	23 46 24.04	1.8109	3 8 9.1	14.700	17	1 15 24.45	1.9268	8 47 56.5	14.758
18	23 48 12.71	1.8116	2 53 26.4	14.723	18	1 17 20.19	1.9312	9 2 41.3	14.733
19	23 50 1.43	1.8123	2 38 42.3	14.746	19	1 19 16.19	1.9355	9 17 24.5	14.707
20	23 51 50.19	1.8131	2 23 56.9	14.767	20	1 21 12.45	1.9399	9 32 6.2	14.681
21	23 53 39.00	1.8140	2 9 10.3	14.787	21	1 23 8.98	1.9444	9 46 46.2	14.653
22	23 55 27.87	1.8149	1 54 22.4	14.807	22	1 25 5.78	1.9490	10 1 24.5	14.623
23	23 57 16.79	1.8159	1 39 33.4	14.826	23	1 27 2.86	1.9537	10 16 0.9	14.592
24	23 59 5.78	1.8170	S. 1 24 43.3	14.844	24	1 29 0.22	1.9584	N. 10 30 35.5	14.560

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	FRIDAY 25.					SUNDAY 27.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	1 29 0.22	1.9584	N.10 30 35.5	14.560	0	3 9 42.46	2.2585	N.21 6 12.3	11.346
1	1 30 57.87	1.9632	10 45 8.1	14.527	1	3 11 58.19	2.2658	21 17 29.9	11.240
2	1 32 55.80	1.9680	10 59 38.7	14.492	2	3 14 14.36	2.2731	21 28 41.1	11.133
3	1 34 54.03	1.9730	11 14 7.1	14.456	3	3 16 30.96	2.2804	21 39 45.9	11.025
4	1 36 52.56	1.9780	11 28 33.4	14 419	4	3 18 48.01	2.2877	21 50 44.1	10.914
5	1 38 51.39	1.9831	11 42 57.4	14.381	5	3 21 5.49	2.2951	22 1 35.6	10.802
6	1 40 50.53	1.9883	11 57 19.1	14.341	6	3 23 23.42	2.3025	22 12 20.3	10.688
7	1 42 49.98	1.9935	12 11 38.3	14.300	7	3 25 41.79	2.3098	22 22 58.1	10.573
8	1 44 49.75	1.9988	12 25 55.1	14.257	8	3 28 0.60	2.3172	22 33 29.0	10.456
9	1 46 49.84	2.0042	12 40 9.2	14.213	9	3 30 19.85	2.3245	22 43 52.8	10.338
10	1 48 50.25	2.0096	12 54 20.7	14.168	10	3 32 39.54	2.3318	22 54 9.5	10.217
11	1 50 50.99	2.0151	13 8 29.4	14.122	11	3 34 59.66	2.3391	23 4 18.8	10.094
12	1 52 52.06	2.0207	13 22 35.3	14.073	12	3 37 20.23	2.3465	23 14 20.8	9.971
13	1 54 53.47	2.0263	13 36 38.2	14.024	13	3 39 41.24	2.3538	23 24 15.3	9.845
14	1 56 55.22	2.0321	13 50 38.2	13.974	14	3 42 2.68	2.3610	23 34 2.2	9.717
15	1 58 57.32	2.0378	14 4 35.1	13.922	15	3 44 24.56	2.3683	23 43 41.4	9.588
16	2 0 59.76	2.0437	14 18 28.8	13.868	16	3 46 46.87	2.3755	23 53 12.8	9.458
17	2 3 2.56	2.0496	14 32 19.2	13.813	17	3 49 9.62	2.3827	24 2 36.4	9.327
18	2 5 5.71	2.0556	14 46 6.3	13.757	18	3 51 32.79	2.3898	24 11 52.0	9.193
19	2 7 9.23	2.0617	14 59 50.0	13.699	19	3 53 56.40	2.3970	24 20 59.5	9.058
20	2 9 13.11	2.0677	15 13 30.2	13.639	20	3 56 20.43	2.4041	24 29 58.9	8.921
21	2 11 17.35	2.0738	15 27 6.7	13.578	21	3 58 44.89	2.4112	24 38 50.0	8.782
22	2 13 21.97	2.0801	15 40 39.5	13.516	22	4 1 9.77	2.4182	24 47 32.8	8.642
23	2 15 26.96	2.0863	N.15 54 8.6	13.453	23	4 3 35.07	2.4252	N.24 56 7.1	8.500
	SATURDAY 26.					MONDAY 28.			
0	2 17 32.33	2.0927	N.16 7 33.8	13.387	0	4 6 0.79	2.4321	N.25 4 32.8	8.357
1	2 19 38.08	2.0991	16 20 55.0	13.320	1	4 8 26.92	2.4389	25 12 49.9	8.212
2	2 21 44.22	2.1055	16 34 12.2	13.252	2	4 10 53.46	2.4457	25 20 58.2	8.065
3	2 23 50.74	2.1120	16 47 25.2	13.182	3	4 13 20.41	2.4525	25 28 57.7	7.917
4	2 25 57.66	2.1186	17 0 34.0	13.110	4	4 15 47.76	2.4592	25 36 48.3	7.768
5	2 28 4.97	2.1252	17 13 38.4	13.037	5	4 18 15.51	2.4658	25 44 29.9	7.617
6	2 30 12.68	2.1318	17 26 38.4	12.962	6	4 20 43.66	2.4723	25 52 2.3	7.464
7	2 32 20.79	2.1386	17 39 33.9	12.886	7	4 23 12.19	2.4788	25 59 25.6	7.311
8	2 34 29.31	2.1453	17 52 24.7	12.808	8	4 25 41.11	2.4853	26 6 39.6	7.155
9	2 36 38.23	2.1521	18 5 10.8	12.729	9	4 28 10.42	2.4916	26 13 44.2	6.997
10	2 38 47.56	2.1589	18 17 52.2	12.648	10	4 30 40.10	2.4978	26 20 39.3	6.839
11	2 40 57.30	2.1658	18 30 28.7	12.566	11	4 33 10.15	2.5039	26 27 24.9	6.680
12	2 43 7.46	2.1727	18 43 0.1	12.481	12	4 35 40.57	2.5100	26 34 0.9	6.518
13	2 45 18.03	2.1797	18 55 26.4	12.396	13	4 38 11.35	2.5160	26 40 27.1	6.356
14	2 47 29.02	2.1868	19 7 47.6	12.309	14	4 40 42.49	2.5218	26 46 43.6	6.193
15	2 49 40.44	2.1938	19 20 3.5	12.220	15	4 43 13.97	2.5276	26 52 50.2	6.028
16	2 51 52.28	2.2008	19 32 14.0	12.129	16	4 45 45.80	2.5333	26 58 46.9	5.861
17	2 54 4.54	2.2080	19 44 19.0	12.037	17	4 48 17.96	2.5388	27 4 33.5	5.693
18	2 56 17.24	2.2152	19 56 18.4	11.943	18	4 50 50.45	2.5443	27 10 10.0	5.523
19	2 58 30.36	2.2223	20 8 12.2	11.848	19	4 53 23.27	2.5496	27 15 36.3	5.353
20	3 0 43.91	2.2295	20 20 0.2	11.751	20	4 55 56.40	2.5548	27 20 52.4	5.182
21	3 2 57.90	2.2367	20 31 42.3	11.652	21	4 58 29.84	2.5598	27 25 58.2	5.009
22	3 5 12.32	2.2439	20 43 18.4	11.551	22	5 1 3.58	2.5648	27 30 53.5	4.835
23	3 7 27.17	2.2512	20 54 48.4	11.449	23	5 3 37.62	2.5697	27 35 38.4	4.661
24	3 9 42.46	2.2585	N.21 6 12.3	11.346	24	5 6 11.95	2.5745	N.27 40 12.8	4.485

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
TUESDAY 29.				
	h m s	s	° ′ ″	″
0	5 6 11.95	2.5745	N. 27 40 12.8	4.485
1	5 8 46.56	2.5790	27 44 36.6	4.308
2	5 11 21.43	2.5834	27 48 49.7	4.129
3	5 13 56.57	2.5878	27 52 52.1	3.950
4	5 16 31.97	2.5920	27 56 43.7	3.770
5	5 19 7.61	2.5960	28 0 24.5	3.589
6	5 21 43.49	2.5998	28 3 54.4	3.407
7	5 24 19.59	2.6036	28 7 13.3	3.224
8	5 26 55.92	2.6073	28 10 21.3	3.041
9	5 29 32.46	2.6107	28 13 18.2	2.856
10	5 32 9.20	2.6139	28 16 4.0	2.671
11	5 34 46.13	2.6171	28 18 38.7	2.485
12	5 37 23.25	2.6201	28 21 2.2	2.298
13	5 40 0.54	2.6229	28 23 14.5	2.111
14	5 42 38.00	2.6256	28 25 15.5	1.923
15	5 45 15.61	2.6281	28 27 5.2	1.734
16	5 47 53.37	2.6304	28 28 43.6	1.545
17	5 50 31.26	2.6326	28 30 10.6	1.356
18	5 53 9.28	2.6346	28 31 26.3	1.166
19	5 55 47.41	2.6364	28 32 30.5	0.975
20	5 58 25.65	2.6382	28 33 23.3	0.784
21	6 1 3.99	2.6397	28 34 4.6	0.593
22	6 3 42.41	2.6410	28 34 34.5	0.402
23	6 6 20.91	2.6422	N. 28 34 52.8	0.209
WEDNESDAY 30.				
0	6 8 59.47	2.6431	N. 28 34 59.6	+0.017
1	6 11 38.08	2.6439	28 34 54.9	−0.175
2	6 14 16.74	2.6446	28 34 38.6	0.368
3	6 16 55.43	2.6451	28 34 10.8	0.560
4	6 19 34.15	2.6454	28 33 31.4	0.752
5	6 22 12.88	2.6455	28 32 40.5	0.945
6	6 24 51.61	2.6455	28 31 38.0	1.138
7	6 27 30.34	2.6453	28 30 23.9	1.331
8	6 30 9.05	2.6449	28 28 58.3	1.523
9	6 32 47.73	2.6443	28 27 21.1	1.716
10	6 35 26.37	2.6437	28 25 32.4	1.908
11	6 38 4.97	2.6428	28 23 32.2	2.100
12	6 40 43.51	2.6417	28 21 20.4	2.292
13	6 43 21.98	2.6405	28 18 57.1	2.483
14	6 46 0.37	2.6392	28 16 22.4	2.674
15	6 48 38.68	2.6377	28 13 36.2	2.866
16	6 51 16.89	2.6359	28 10 38.5	3.056
17	6 53 54.99	2.6341	28 7 29.5	3.246
18	6 56 32.98	2.6321	28 4 9.0	3.436
19	6 59 10.84	2.6299	28 0 37.2	3.624
20	7 1 48.57	2.6277	27 56 54.1	3.813
21	7 4 26.16	2.6253	27 52 59.7	4.001
22	7 7 3.60	2.6226	27 48 54.0	4.188
23	7 9 40.87	2.6198	27 44 37.1	4.375
24	7 12 17.98	2.6169	N. 27 40 9.0	4.561

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
THURSDAY 31.				
	h m s	s	° ′ ″	″
0	7 12 17.98	2.6169	N. 27 40 9.0	4.561
1	7 14 54.90	2.6138	27 35 29.8	4.746
2	7 17 31.64	2.6107	27 30 39.5	4.931
3	7 20 8.19	2.6074	27 25 38.1	5.114
4	7 22 44.53	2.6039	27 20 25.8	5.297
5	7 25 20.66	2.6003	27 15 2.5	5.478
6	7 27 56.57	2.5966	27 9 28.4	5.659
7	7 30 32.25	2.5927	27 3 43.4	5.840
8	7 33 7.70	2.5888	26 57 47.6	6.019
9	7 35 42.91	2.5848	26 51 41.1	6.198
10	7 38 17.88	2.5807	26 45 23.9	6.375
11	7 40 52.59	2.5763	26 38 56.1	6.551
12	7 43 27.04	2.5719	26 32 17.8	6.726
13	7 46 1.22	2.5674	26 25 29.0	6.900
14	7 48 35.13	2.5628	26 18 29.8	7.073
15	7 51 8.75	2.5580	26 11 20.2	7.245
16	7 53 42.09	2.5532	26 4 0.4	7.415
17	7 56 15.14	2.5483	25 56 30.4	7.584
18	7 58 47.89	2.5433	25 48 50.3	7.753
19	8 1 20.34	2.5383	25 41 0.1	7.920
20	8 3 52.49	2.5332	25 32 59.9	8.086
21	8 6 24.32	2.5279	25 24 49.8	8.251
22	8 8 55.84	2.5227	25 16 29.8	8.414
23	8 11 27.04	2.5173	N. 25 8 0.1	8.575
FRIDAY, NOVEMBER 1.				
0	8 13 57.91	2.5118	N. 24 59 20.8	8.735

PHASES OF THE MOON.

			d	h	m
☾	Last Quarter	Oct.	3	8	48.1
●	New Moon		10	1	40.6
☽	First Quarter		17	14	6.2
○	Full Moon		25	14	30.5

			d	h
☾	Perigee	Oct.	7	6.8
☾	Apogee		19	2.0

AT GREENWICH APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S					Sidereal Time of Semidiameter Passing Meridian.	Equation of Time, to be Subtracted from Apparent Time.	Diff. for 1 Hour.
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.	Semidiameter.			
		h m s	s	° ′ ″	″	′ ″	s	m s	s
Frid.	1	14 25 13.69	9.791	S. 14 24 23.8	−48.16	16 9.18	66.89	16 20.71	0.065
Sat.	2	14 29 9.09	9.825	14 43 32.9	47.58	16 9.42	67.00	16 21.87	0.031
SUN.	3	14 33 5.32	9.860	15 2 27.8	46.98	16 9.66	67.11	16 22.20	0.004
Mon.	4	14 37 2.38	9.894	15 21 8.2	−46.36	16 9.90	67.23	16 21.69	0.039
Tues.	5	14 41 0.28	9.929	15 39 33.4	45.73	16 10.14	67.34	16 20.35	0.074
Wed.	6	14 44 59.03	9.964	15 57 43.2	45.08	16 10.37	67.46	16 18.16	0.110
Thur.	7	14 48 58.64	10.000	16 15 37.1	−44.41	16 10.60	67.58	16 15.12	0.145
Frid.	8	14 52 59.10	10.035	16 33 14.6	43.71	16 10.83	67.70	16 11.23	0.180
Sat.	9	14 57 0.40	10.071	16 50 35.4	43.00	16 11.07	67.82	16 6.50	0.215
SUN.	10	15 1 2.55	10.106	17 7 39.0	−42.28	16 11.30	67.94	16 0.92	0.251
Mon.	11	15 5 5.54	10.142	17 24 24.9	41.54	16 11.53	68.07	15 54.50	0.286
Tues.	12	15 9 9.38	10.177	17 40 52.8	40.78	16 11.76	68.19	15 47.23	0.321
Wed.	13	15 13 14.07	10.212	17 57 2.4	−40.00	16 11.99	68.31	15 39.12	0.356
Thur.	14	15 17 19.59	10.247	18 12 53.0	39.21	16 12.21	68.43	15 30.18	0.390
Frid.	15	15 21 25.95	10.282	18 28 24.3	38.40	16 12.43	68.55	15 20.41	0.425
Sat.	16	15 25 33.14	10.316	18 43 36.0	−37.57	16 12.65	68.67	15 9.81	0.459
SUN.	17	15 29 41.15	10.350	18 58 27.6	36.73	16 12.86	68.79	14 58.38	0.493
Mon.	18	15 33 49.98	10.384	19 12 58.9	35.87	16 13.07	68.90	14 46.14	0.527
Tues.	19	15 37 59.63	10.418	19 27 9.5	−35.00	16 13.28	69.02	14 33.09	0.561
Wed.	20	15 42 10.09	10.452	19 40 58.9	34.11	16 13.48	69.13	14 19.23	0.594
Thur.	21	15 46 21.35	10.486	19 54 26.8	33.20	16 13.68	69.24	14 4.57	0.627
Frid.	22	15 50 33.40	10.519	20 7 32.9	−32.28	16 13.87	69.35	13 49.12	0.660
Sat.	23	15 54 46.23	10.552	20 20 16.9	31.36	16 14.06	69.46	13 32.89	0.693
SUN.	24	15 58 59.84	10.584	20 32 38.3	30.42	16 14.25	69.56	13 15.88	0.725
Mon.	25	16 3 14.23	10.616	20 44 36.9	−29.46	16 14.43	69.67	12 58.10	0.757
Tues.	26	16 7 29.38	10.647	20 56 12.4	28.49	16 14.60	69.77	12 39.57	0.788
Wed.	27	16 11 45.27	10.678	21 7 24.4	27.51	16 14.77	69.87	12 20.29	0.819
Thur.	28	16 16 1.90	10.708	21 18 12.6	−26.51	16 14.93	69.97	12 0.27	0.849
Frid.	29	16 20 19.25	10.738	21 28 36.7	25.50	16 15.09	70.07	11 39.52	0.879
Sat.	30	16 24 37.32	10.767	21 38 36.4	24.48	16 15.24	70.16	11 18.07	0.908
SUN.	31	16 28 56.08	10.795	S. 21 48 11.5	−23.44	16 15.39	70.25	10 55.93	0.936

NOTE.—The mean time of semidiameter passing may be found by subtracting $0^s.19$ from the sidereal time.
The sign − prefixed to the hourly change of declination indicates that south declinations are increasing.

AT GREENWICH MEAN NOON.

Day of the Week.	Day of the Month.	THE SUN'S				Equation of Time, to be Added to Mean Time.	Diff. for 1 Hour.	Sidereal Time, or Right Ascension of Mean Sun.
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.			
		h m s	s	° ′ ″	″	m s	s	h m s
Frid.	1	14 25 16.36	9.792	S. 14 24 36.9	−48.16	16 20.73	0.065	14 41 37.09
Sat.	2	14 29 11.77	9.826	14 43 45.9	47.58	16 21.88	0.031	14 45 33.65
SUN.	3	14 33 8.01	9.861	15 2 40.7	46.98	16 22.20	0.004	14 49 30.20
Mon.	4	14 37 5.08	9.895	15 21 20.8	−46.36	16 21.68	0.039	14 53 26.76
Tues.	5	14 41 2.99	9.930	15 39 45.8	45.72	16 20.33	0.074	14 57 23.31
Wed.	6	14 45 1.74	9.965	15 57 55.4	45.07	16 18.13	0.110	15 1 19.87
Thur.	7	14 49 1.34	10.001	16 15 49.1	−44.40	16 15.08	0.145	15 5 16.43
Frid.	8	14 53 1.79	10.036	16 33 26.4	43.71	16 11.18	0.180	15 9 12.98
Sat.	9	14 57 3.09	10.071	16 50 46.9	43.00	16 6.44	0.215	15 13 9.54
SUN.	10	15 1 5.24	10.107	17 7 50.3	−42.28	16 0.85	0.251	15 17 6.10
Mon.	11	15 5 8.23	10.142	17 24 36.0	41.53	15 54.42	0.286	15 21 2.65
Tues.	12	15 9 12.06	10.177	17 41 3.6	40.77	15 47.14	0.321	15 24 59.21
Wed.	13	15 13 16.73	10.212	17 57 12.8	−39.99	15 39.03	0.356	15 28 55.77
Thur.	14	15 17 22.24	10.247	18 13 3.1	39.19	15 30.08	0.390	15 32 52.32
Frid.	15	15 21 28.58	10.282	18 28 34.1	38.38	15 20.30	0.425	15 36 48.88
Sat.	16	15 25 35.75	10.316	18 43 45.5	−37.56	15 9.69	0.459	15 40 45.44
SUN.	17	15 29 43.73	10.350	18 58 36.8	36.72	14 58.26	0.493	15 44 42.00
Mon.	18	15 33 52.54	10.384	19 13 7.8	35.86	14 46.01	0.527	15 48 38.55
Tues.	19	15 38 2.16	10.418	19 27 18.0	−34.99	14 32.95	0.561	15 52 35.11
Wed.	20	15 42 12.58	10.451	19 41 7.1	34.10	14 19.09	0.594	15 56 31.67
Thur.	21	15 46 23.80	10.484	19 54 34.7	33.19	14 4.43	0.627	16 0 28.22
Frid.	22	15 50 35.81	10.517	20 7 40.4	−32.27	13 48.97	0.660	16 4 24.78
Sat.	23	15 54 48.61	10.550	20 20 24.0	31.35	13 32.73	0.693	16 8 21.34
SUN.	24	15 59 2.18	10.582	20 32 45.1	30.40	13 15.72	0.725	16 12 17.90
Mon.	25	16 3 16.52	10.614	20 44 43.3	−29.44	12 57.94	0.757	16 16 14.46
Tues.	26	16 7 31.62	10.645	20 56 18.4	28.46	12 39.40	0.788	16 20 11.01
Wed.	27	16 11 47.46	10.676	21 7 30.0	27.48	12 20.11	0.819	16 24 7.57
Thur.	28	16 16 4.04	10.706	21 18 17.8	−26.49	12 0.09	0.849	16 28 4.13
Frid.	29	16 20 21.34	10.736	21 28 41.6	25.48	11 39.34	0.879	16 32 0.69
Sat.	30	16 24 39.35	10.765	21 38 41.0	24.46	11 17.89	0.908	16 35 57.25
SUN.	31	16 28 58.05	10.793	S. 21 48 15.7	−23.42	10 55.76	0.936	16 39 53.81

NOTE.—The semidiameter for mean noon may be assumed the same as that for apparent noon. The sign − prefixed to the hourly change of declination indicates that south declinations are increasing.

Diff. for 1 Hour, $+9^{s}.8565$. (Table III.)

AT GREENWICH MEAN NOON.

Day of the Month.	Day of the Year.	THE SUN'S				Logarithm of the Radius Vector of the Earth.	Diff. for 1 Hour.	Mean Time of Sidereal Noon.
		True Longitude.		Diff. for 1 Hour.	Latitude.			
		λ	λ'					
		° ′ ″	′ ″	″	″			h m s
1	306	218 42 33.7	41 56.3	150.19	+0.59	9.996 5482	−45.6	9 16 51.43
2	307	219 42 39.2	42 1.7	150.28	0.53	9.996 4393	45.2	9 12 55.52
3	308	220 42 46.9	42 9.3	150.37	0.44	9.996 3314	44.8	9 8 59.61
4	309	221 42 56.8	42 19.0	150.46	+0.33	9.996 2244	−44.5	9 5 3.70
5	310	222 43 8.7	42 30.7	150.54	0.20	9.996 1181	44.2	9 1 7.79
6	311	223 43 22.6	42 44.5	150.62	+0.06	9.996 0124	43.9	8 57 11.88
7	312	224 43 38.5	43 0.3	150.70	−0.07	9.995 9074	−43.6	8 53 15.97
8	313	225 43 56.3	43 18.0	150.78	0.20	9.995 8030	43.3	8 49 20.06
9	314	226 44 15.9	43 37.4	150.85	0.32	9.995 6992	43.1	8 45 24.15
10	315	227 44 37.2	43 58.5	150.92	−0.41	9.995 5960	−42.8	8 41 28.24
11	316	228 45 0.1	44 21.2	150.99	0.48	9.995 4936	42.5	8 37 32.33
12	317	229 45 24.6	44 45.5	151.05	0.53	9.995 3920	42.1	8 33 36.42
13	318	230 45 50.5	45 11.3	151.11	−0.54	9.995 2913	−41.7	8 29 40.51
14	319	231 46 17.8	45 38.5	151.17	0.52	9.995 1916	41.3	8 25 44.60
15	320	232 46 46.5	46 7.0	151.22	0.47	9.995 0932	40.8	8 21 48.69
16	321	233 47 16.6	46 36.8	151.28	−0.40	9.994 9960	−40.2	8 17 52.77
17	322	234 47 47.9	47 8.0	151.33	0.31	9.994 9003	39.6	8 13 56.86
18	323	235 48 20.6	47 40.5	151.39	0.21	9.994 8062	38.9	8 10 0.95
19	324	236 48 54.5	48 14.2	151.44	−0.09	9.994 7137	−38.1	8 6 5.04
20	325	237 49 29.6	48 49.2	151.49	+0.04	9.994 6231	37.3	8 2 9.13
21	326	238 50 6.0	49 25.4	151.54	0.16	9.994 5345	36.5	7 58 13.22
22	327	239 50 43.7	50 2.9	151.59	+0.28	9.994 4480	−35.6	7 54 17.30
23	328	240 51 22.6	50 41.7	151.65	0.39	9.994 3636	34.7	7 50 21.39
24	329	241 52 2.9	51 21.8	151.70	0.48	9.994 2815	33.7	7 46 25.48
25	330	242 52 44.5	52 3.2	151.76	+0.56	9.994 2018	−32.7	7 42 29.57
26	331	243 53 27.5	52 46.0	151.82	0.61	9.994 1245	31.7	7 38 33.66
27	332	244 54 11.9	53 30.2	151.88	0.63	9.994 0495	30.7	7 34 37.74
28	333	245 54 57.8	54 15.9	151.94	+0.61	9.993 9769	−29.8	7 30 41.83
29	334	246 55 45.2	55 3.1	152.00	0.56	9.993 9065	28.9	7 26 45.92
30	335	247 56 34.1	55 51.8	152.07	0.48	9.993 8382	28.0	7 22 50.01
31	336	248 57 24.4	56 42.0	152.13	+0.37	9.993 7719	−27.2	7 18 54.10

NOTE.—The longitudes in the column λ are referred to the true equinox of their own date, while those in the column λ' are referred to the mean equinox of the beginning of the Besselian fictitious year.

Diff. for 1 Hour, $-9^s.8296$. (Table II.)

GREENWICH MEAN TIME.

Day of the Month.	THE MOON'S								
	SEMIDIAMETER.		HORIZONTAL PARALLAX.				UPPER TRANSIT.		AGE.
	Noon.	Midnight.	Noon.	Diff. for 1 Hour.	Midnight.	Diff. for 1 Hour.	Meridian of Greenwich.	Diff. for 1 Hour.	Noon.
	′ ″	′ ″	′ ″	″	′ ″	″	h m	m	d
1	16 8.3	16 9.4	59 7.8	+0.37	59 11.8	+0.28	18 14.2	2.33	21.9
2	16 10.2	16 10.6	59 14.7	+0.19	59 16.4	+0.09	19 8.1	2.17	22.9
3	16 10.8	16 10.6	59 16.9	−0.01	59 16.1	−0.13	19 58.6	2.05	23.9
4	16 9.9	16 8.9	59 13.9	−0.25	59 10.1	−0.38	20 46.8	1.98	24.9
5	16 7.4	16 5.5	59 4.6	0.52	58 57.4	0.67	21 33.9	1.96	25.9
6	16 3.0	16 0.1	58 48.4	0.83	58 37.6	0.98	22 21.3	2.00	26.9
7	15 56.6	15 52.8	58 25.1	−1.12	58 10.8	−1.25	23 10.0	2.07	27.9
8	15 48.5	15 43.8	57 55.0	1.37	57 38.0	1.47	6 .	. .	28.9
9	15 38.9	15 33.8	57 19.9	1.55	57 1.0	1.60	0 0.9	2.17	0.4
10	15 28.5	15 23.2	56 41.7	−1.62	56 22.3	−1.61	0 54.1	2.25	1.4
11	15 18.0	15 13.0	56 3.2	1.57	55 44.7	1.51	1 48.8	2.29	2.4
12	15 8.2	15 3.8	55 27.2	1.41	55 10.9	1.29	2 43.8	2.27	3.4
13	14 59.8	14 56.3	54 56.2	−1.15	54 43.4	−0.99	3 37.5	2.19	4.4
14	14 53.3	14 51.0	54 32.6	0.81	54 24.0	0.61	4 28.4	2.05	5.4
15	14 49.3	14 48.3	54 17.9	−0.41	54 14.3	−0.19	5 16.1	1.92	6.4
16	14 48.0	14 48.5	54 13.3	+0.03	54 15.0	+0.25	6 0.7	1.80	7.4
17	14 49.7	14 51.6	54 19.3	0.47	54 26.2	0.68	6 42.9	1.72	8.4
18	14 54.2	14 57.4	54 35.7	0.89	54 47.6	1.09	7 23.5	1.68	9.4
19	15 1.3	15 5.7	55 1.8	+1.27	55 18.0	+1.43	8 3.7	1.68	10.4
20	15 10.6	15 15.9	55 36.0	1.57	55 55.5	1.68	8 44.7	1.74	11.4
21	15 21.5	15 27.4	56 16.1	1.76	56 37.6	1.81	9 27.8	1.86	12.4
22	15 33.3	15 39.3	56 59.4	+1.82	57 21.2	+1.80	10 14.3	2.02	13.4
23	15 45.1	15 50.7	57 42.6	1.75	58 3.1	1.66	11 5.3	2.23	14.4
24	15 55.9	16 0.6	58 22.2	1.53	58 39.6	1.37	12 1.5	2.45	15.4
25	16 4.8	16 8.4	58 55.1	+1.20	59 8.3	+1.00	13 2.4	2.61	16.4
26	16 11.4	16 13.6	59 19.1	0.79	59 27.3	0.58	14 6.0	2.66	17.4
27	16 15.2	16 16.0	59 33.0	+0.37	59 36.3	+0.17	15 9.1	2.58	18.4
28	16 16.3	16 15.9	59 37.2	−0.02	59 35.9	−0.19	16 9.2	2.41	19.4
29	16 15.1	16 13.7	59 32.7	0.34	59 27.7	0.48	17 4.8	2.22	20.4
30	16 12.0	16 9.8	59 21.2	0.59	59 13.5	0.69	17 56.2	2.07	21.4
31	16 7.5	16 4.8	59 4.8	−0.77	58 55.1	−0.84	18 44.4	1.96	22.4

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	FRIDAY 1.					SUNDAY 3.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	8 13 57.91	2.5118	N.24 59 20.8	8.735	0	10 7 45.06	2.2327	N.15 23 45.0	14.635
1	8 16 28.45	2.5063	24 50 31.9	8.894	1	10 9 58.87	2.2276	15 9 4.4	14.718
2	8 18 58.66	2.5007	24 41 33.5	9.052	2	10 12 12.37	2.2225	14 54 18.9	14.799
3	8 21 28.53	2.4950	24 32 25.6	9.209	3	10 14 25.57	2.2175	14 39 28.5	14.879
4	8 23 58.06	2.4893	24 23 8.4	9.363	4	10 16 38.47	2.2125	14 24 33.4	14.957
5	8 26 27.25	2.4837	24 13 42.0	9.517	5	10 18 51.07	2.2077	14 9 33.7	15.033
6	8 28 56.10	2.4779	24 4 6.4	9.669	6	10 21 3.39	2.2030	13 54 29.4	15.109
7	8 31 24.60	2.4721	23 54 21.7	9.820	7	10 23 15.43	2.1983	13 39 20.6	15.183
8	8 33 52.75	2.4662	23 44 28.0	9.968	8	10 25 27.18	2.1935	13 24 7.5	15.254
9	8 36 20.54	2.4603	23 34 25.5	10.116	9	10 27 38.65	2.1888	13 8 50.1	15.325
10	8 38 47.98	2.4543	23 24 14.1	10.263	10	10 29 49.84	2.1843	12 53 28.5	15.393
11	8 41 15.06	2.4484	23 13 54.0	10.408	11	10 32 0.77	2.1800	12 38 2.9	15.460
12	8 43 41.79	2.4424	23 3 25.2	10.551	12	10 34 11.44	2.1757	12 22 33.3	15.526
13	8 46 8.15	2.4363	22 52 47.9	10.692	13	10 36 21.85	2.1713	12 6 59.8	15.589
14	8 48 34.15	2.4303	22 42 2.2	10.832	14	10 38 32.00	2.1671	11 51 22.6	15.651
15	8 50 59.79	2.4243	22 31 8.1	10.971	15	10 40 41.90	2.1629	11 35 41.7	15.712
16	8 53 25.07	2.4183	22 20 5.7	11.108	16	10 42 51.55	2.1588	11 19 57.2	15.771
17	8 55 49.98	2.4122	22 8 55.2	11.243	17	10 45 0.96	2.1548	11 4 9.2	15.828
18	8 58 14.53	2.4061	21 57 36.6	11.377	18	10 47 10.13	2.1509	10 48 17.8	15.884
19	9 0 38.71	2.4000	21 46 10.0	11.509	19	10 49 19.07	2.1471	10 32 23.1	15.938
20	9 3 2.53	2.3939	21 34 35.5	11.639	20	10 51 27.78	2.1433	10 16 25.2	15.991
21	9 5 25.98	2.3878	21 22 53.3	11.768	21	10 53 36.27	2.1397	10 0 24.2	16.042
22	9 7 49.07	2.3818	21 11 3.3	11.897	22	10 55 44.54	2.1360	9 44 20.2	16.092
23	9 10 11.79	2.3757	N.20 59 5.7	12.022	23	10 57 52.59	2.1325	N. 9 28 13.2	16.140
	SATURDAY 2.					MONDAY 4.			
0	9 12 34.15	2.3696	N.20 47 0.7	12.145	0	11 0 0.44	2.1292	N. 9 12 3.4	16.186
1	9 14 56.14	2.3635	20 34 48.3	12.267	1	11 2 8.09	2.1258	8 55 50.9	16.231
2	9 17 17.77	2.3575	20 22 28.6	12.389	2	11 4 15.53	2.1224	8 39 35.7	16.274
3	9 19 39.04	2.3515	20 10 1.6	12.509	3	11 6 22.78	2.1192	8 23 18.0	16.315
4	9 21 59.95	2.3454	19 57 27.5	12.626	4	11 8 29.84	2.1162	8 6 57.9	16.355
5	9 24 20.49	2.3394	19 44 46.5	12.742	5	11 10 36.72	2.1131	7 50 35.4	16.394
6	9 26 40.68	2.3334	19 31 58.5	12.857	6	11 12 43.41	2.1101	7 34 10.6	16.431
7	9 29 0.51	2.3274	19 19 3.7	12.969	7	11 14 49.93	2.1073	7 17 43.7	16.466
8	9 31 19.98	2.3216	19 6 2.2	13.080	8	11 16 56.29	2.1046	7 1 14.7	16.500
9	9 33 39.10	2.3158	18 52 54.1	13.190	9	11 19 2.48	2.1018	6 44 43.7	16.532
10	9 35 57.87	2.3099	18 39 39.4	13.298	10	11 21 8.51	2.0992	6 28 10.8	16.563
11	9 38 16.29	2.3041	18 26 18.3	13.404	11	11 23 14.39	2.0967	6 11 36.1	16.592
12	9 40 34.36	2.2983	18 12 50.9	13.508	12	11 25 20.12	2.0943	5 54 59.7	16.620
13	9 42 52.09	2.2926	17 59 17.3	13.611	13	11 27 25.71	2.0920	5 38 21.7	16.647
14	9 45 9.47	2.2868	17 45 37.6	13.712	14	11 29 31.16	2.0897	5 21 42.1	16.672
15	9 47 26.51	2.2812	17 31 51.8	13.812	15	11 31 36.47	2.0874	5 5 1.1	16.694
16	9 49 43.22	2.2757	17 18 0.1	13.910	16	11 33 41.65	2.0853	4 48 18.8	16.715
17	9 51 59.59	2.2701	17 4 2.6	14.007	17	11 35 46.71	2.0834	4 31 35.3	16.735
18	9 54 15.63	2.2646	16 49 59.4	14.101	18	11 37 51.66	2.0815	4 14 50.6	16.754
19	9 56 31.34	2.2591	16 35 50.5	14.194	19	11 39 56.49	2.0797	3 58 4.8	16.772
20	9 58 46.72	2.2537	16 21 36.1	14.286	20	11 42 1.22	2.0779	3 41 18.0	16.787
21	10 1 1.78	2.2483	16 7 16.2	14.376	21	11 44 5.84	2.0762	3 24 30.3	16.801
22	10 3 16.52	2.2431	15 52 51.0	14.463	22	11 46 10.36	2.0746	3 7 41.9	16.813
23	10 5 30.95	2.2378	15 38 20.6	14.550	23	11 48 14.79	2.0732	2 50 52.8	16.824
24	10 7 45.06	2.2327	N.15 23 45.0	14.635	24	11 50 19.14	2.0718	N. 2 34 3.0	16.834

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	TUESDAY 5.					THURSDAY 7.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	11 50 19.14	2.0718	N. 2 34 3.0	16.834	0	13 29 43.38	2.0998	S. 10 36 39.9	15.550
1	11 52 23.40	2.0704	2 17 12.7	16.842	1	13 31 49.44	2.1022	10 52 11.0	15.488
2	11 54 27.59	2.0692	2 0 22.0	16.848	2	13 33 55.65	2.1047	11 7 38.4	15.424
3	11 56 31.71	2.0681	1 43 31.0	16.853	3	13 36 2.00	2.1072	11 23 1.9	15.358
4	11 58 35.76	2.0670	1 26 39.7	16.857	4	13 38 8.51	2.1097	11 38 21.4	15.292
5	12 0 39.75	2.0661	1 9 48.2	16.858	5	13 40 15.17	2.1123	11 53 36.9	15.224
6	12 2 43.69	2.0652	0 52 56.7	16.859	6	13 42 21.99	2.1149	12 8 48.3	15.154
7	12 4 47.57	2.0643	0 36 5.1	16.858	7	13 44 28.96	2.1176	12 23 55.4	15.083
8	12 6 51.41	2.0637	0 19 13.7	16.855	8	13 46 36.10	2.1204	12 38 58.3	15.012
9	12 8 55.21	2.0630	N. 0 2 22.5	16.851	9	13 48 43.41	2.1232	12 53 56.8	14.938
10	12 10 58.97	2.0624	S. 0 14 28.4	16.846	10	13 50 50.89	2.1261	13 8 50.9	14.863
11	12 13 2.70	2.0620	0 31 19.0	16.839	11	13 52 58.54	2.1290	13 23 40.4	14.787
12	12 15 6.41	2.0617	0 48 9.1	16.831	12	13 55 6.37	2.1319	13 38 25.3	14.709
13	12 17 10.10	2.0613	1 4 58.7	16.821	13	13 57 14.37	2.1349	13 53 5.5	14.630
14	12 19 13.77	2.0611	1 21 47.6	16.809	14	13 59 22.56	2.1380	14 7 40.9	14.549
15	12 21 17.43	2.0609	1 38 35.8	16.796	15	14 1 30.93	2.1411	14 22 11.4	14.467
16	12 23 21.08	2.0609	1 55 23.1	16.781	16	14 3 39.49	2.1442	14 36 37.0	14.384
17	12 25 24.74	2.0610	2 12 9.5	16.766	17	14 5 48.24	2.1474	14 50 57.5	14.299
18	12 27 28.40	2.0610	2 28 55.0	16.749	18	14 7 57.18	2.1507	15 5 12.9	14.213
19	12 29 32.06	2.0612	2 45 39.4	16.730	19	14 10 6.32	2.1540	15 19 23.1	14.126
20	12 31 35.74	2.0616	3 2 22.6	16.709	20	14 12 15.66	2.1573	15 33 28.0	14.038
21	12 33 39.45	2.0619	3 19 4.5	16.688	21	14 14 25.19	2.1605	15 47 27.6	13.948
22	12 35 43.17	2.0623	3 35 45.1	16.665	22	14 16 34.92	2.1638	16 1 21.8	13.857
23	12 37 46.92	2.0628	S. 3 52 24.3	16.640	23	14 18 44.85	2.1673	S. 16 15 10.4	13.763
	WEDNESDAY 6.					FRIDAY 8.			
0	12 39 50.71	2.0634	S. 4 9 1.9	16.613	0	14 20 54.99	2.1708	S. 16 28 53.4	13.669
1	12 41 54.53	2.0641	4 25 37.9	16.586	1	14 23 5.34	2.1742	16 42 30.7	13.574
2	12 43 58.40	2.0648	4 42 12.2	16.557	2	14 25 15.89	2.1776	16 56 2.3	13.478
3	12 46 2.31	2.0657	4 58 44.7	16.527	3	14 27 26.65	2.1812	17 9 28.1	13.380
4	12 48 6.28	2.0666	5 15 15.4	16.495	4	14 29 37.63	2.1848	17 22 47.9	13.280
5	12 50 10.30	2.0676	5 31 44.1	16.461	5	14 31 48.82	2.1883	17 36 1.7	13.180
6	12 52 14.39	2.0687	5 48 10.7	16.426	6	14 34 0.23	2.1919	17 49 9.5	13.078
7	12 54 18.54	2.0698	6 4 35.2	16.390	7	14 36 11.85	2.1954	18 2 11.1	12.975
8	12 56 22.76	2.0710	6 20 57.5	16.352	8	14 38 23.68	2.1991	18 15 6.5	12.871
9	12 58 27.06	2.0723	6 37 17.4	16.312	9	14 40 35.74	2.2027	18 27 55.6	12.765
10	13 0 31.43	2.0736	6 53 34.9	16.272	10	14 42 48.01	2.2063	18 40 38.3	12.658
11	13 2 35.89	2.0751	7 9 50.0	16.230	11	14 45 0.50	2.2101	18 53 14.6	12.551
12	13 4 40.44	2.0766	7 26 2.5	16.186	12	14 47 13.22	2.2138	19 5 44.4	12.441
13	13 6 45.08	2.0781	7 42 12.3	16.141	13	14 49 26.15	2.2174	19 18 7.5	12.330
14	13 8 49.81	2.0798	7 58 19.4	16.094	14	14 51 39.31	2.2212	19 30 24.0	12.219
15	13 10 54.65	2.0816	8 14 23.6	16.046	15	14 53 52.69	2.2248	19 42 33.8	12.106
16	13 12 59.60	2.0833	8 30 24.9	15.998	16	14 56 6.28	2.2284	19 54 36.7	11.991
17	13 15 4.65	2.0851	8 46 23.3	15.947	17	14 58 20.10	2.2322	20 6 32.7	11.876
18	13 17 9.81	2.0870	9 2 18.5	15.893	18	15 0 34.14	2.2359	20 18 21.8	11.760
19	13 19 15.09	2.0890	9 18 10.5	15.839	19	15 2 48.41	2.2396	20 30 3.9	11.642
20	13 21 20.49	2.0911	9 33 59.2	15.784	20	15 5 2.89	2.2433	20 41 38.8	11.523
21	13 23 26.02	2.0932	9 49 44.6	15.728	21	15 7 17.60	2.2470	20 53 6.6	11.403
22	13 25 31.67	2.0953	10 5 26.6	15.670	22	15 9 32.53	2.2507	21 4 27.1	11.282
23	13 27 37.46	2.0976	10 21 5.0	15.611	23	15 11 47.68	2.2543	21 15 40.4	11.160
24	13 29 43.38	2.0998	S. 10 36 39.9	15.550	24	15 14 3.04	2.2579	S. 21 26 46.3	11.037

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	SATURDAY 9.					MONDAY 11.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	15 14 3.04	2.2579	S.21 26 46.3	11.037	0	17 5 52.29	2.3765	S.27 37 7.2	4.133
1	15 16 18.63	2.2616	21 37 44.8	10.912	1	17 8 14.90	2.3771	27 41 10.4	3.976
2	15 18 34.43	2.2652	21 48 35.7	10.786	2	17 10 37.54	2.3776	27 45 4.3	3.820
3	15 20 50.45	2.2688	21 59 19.1	10.659	3	17 13 0.21	2.3779	27 48 48.8	3.663
4	15 23 6.68	2.2723	22 9 54.8	10.532	4	17 15 22.89	2.3781	27 52 23.9	3.506
5	15 25 23.12	2.2758	22 20 22.9	10.403	5	17 17 45.58	2.3783	27 55 49.5	3.349
6	15 27 39.78	2.2794	22 30 43.2	10.273	6	17 20 8.28	2.3783	27 59 5.8	3.193
7	15 29 56.65	2.2829	22 40 55.7	10.143	7	17 22 30.97	2.3782	28 2 12.7	3.036
8	15 32 13.73	2.2863	22 51 0.3	10.011	8	17 24 53.66	2.3781	28 5 10.1	2.878
9	15 34 31.01	2.2898	23 0 57.0	9.878	9	17 27 16.34	2.3778	28 7 58.1	2.722
10	15 36 48.50	2.2932	23 10 45.7	9.745	10	17 29 38.99	2.3773	28 10 36.8	2.566
11	15 39 6.19	2.2965	23 20 26.4	9.611	11	17 32 1.62	2.3768	28 13 6.0	2.408
12	15 41 24.08	2.2998	23 29 59.0	9.475	12	17 34 24.21	2.3762	28 15 25.8	2.252
13	15 43 42.17	2.3031	23 39 23.4	9.338	13	17 36 46.76	2.3755	28 17 36.2	2.096
14	15 46 0.45	2.3063	23 48 39.6	9.201	14	17 39 9.27	2.3747	28 19 37.3	1.940
15	15 48 18.93	2.3095	23 57 47.5	9.063	15	17 41 31.73	2.3738	28 21 29.0	1.783
16	15 50 37.59	2.3126	24 6 47.1	8.923	16	17 43 54.12	2.3727	28 23 11.3	1.627
17	15 52 56.44	2.3157	24 15 38.3	8.783	17	17 46 16.45	2.3716	28 24 44.2	1.471
18	15 55 15.48	2.3188	24 24 21.1	8.643	18	17 48 38.71	2.3703	28 26 7.8	1.316
19	15 57 34.70	2.3218	24 32 55.5	8.502	19	17 51 0.89	2.3690	28 27 22.1	1.160
20	15 59 54.09	2.3247	24 41 21.3	8.358	20	17 53 22.99	2.3676	28 28 27.0	1.005
21	16 2 13.66	2.3276	24 49 38.5	8.215	21	17 55 45.00	2.3660	28 29 22.7	0.851
22	16 4 33.40	2.3304	24 57 47.1	8.072	22	17 58 6.91	2.3643	28 30 9.1	0.696
23	16 6 53.31	2.3332	S.25 5 47.1	7.927	23	18 0 28.72	2.3626	S.28 30 46.2	0.542
	SUNDAY 10.					TUESDAY 12.			
0	16 9 13.38	2.3358	S.25 13 38.4	7.782	0	18 2 50.42	2.3608	S.28 31 14.1	0.388
1	16 11 33.61	2.3384	25 21 20.9	7.636	1	18 5 12.01	2.3588	28 31 32.8	0.234
2	16 13 53.99	2.3410	25 28 54.7	7.489	2	18 7 33.47	2.3567	28 31 42.2	−0.081
3	16 16 14.53	2.3435	25 36 19.6	7.341	3	18 9 54.81	2.3545	28 31 42.5	+0.071
4	16 18 35.21	2.3459	25 43 35.6	7.193	4	18 12 16.01	2.3522	28 31 33.7	0.223
5	16 20 56.04	2.3482	25 50 42.8	7.045	5	18 14 37.07	2.3498	28 31 15.7	0.376
6	16 23 17.00	2.3505	25 57 41.0	6.895	6	18 16 57.99	2.3473	28 30 48.6	0.527
7	16 25 38.10	2.3527	26 4 30.2	6.746	7	18 19 18.75	2.3448	28 30 12.5	0.678
8	16 27 59.33	2.3548	26 11 10.5	6.596	8	18 21 39.36	2.3422	28 29 27.3	0.828
9	16 30 20.68	2.3568	26 17 41.7	6.444	9	18 23 59.81	2.3394	28 28 33.2	0.977
10	16 32 42.15	2.3588	26 24 3.8	6.293	10	18 26 20.09	2.3366	28 27 30.1	1.127
11	16 35 3.74	2.3607	26 30 16.9	6.142	11	18 28 40.20	2.3337	28 26 18.1	1.275
12	16 37 25.43	2.3624	26 36 20.8	5.988	12	18 31 0.13	2.3306	28 24 57.1	1.423
13	16 39 47.23	2.3642	26 42 15.5	5.836	13	18 33 19.87	2.3274	28 23 27.3	1.570
14	16 42 9.13	2.3658	26 48 1.1	5.683	14	18 35 39.42	2.3242	28 21 48.7	1.717
15	16 44 31.12	2.3672	26 53 37.5	5.529	15	18 37 58.78	2.3210	28 20 1.2	1.864
16	16 46 53.19	2.3686	26 59 4.6	5.375	16	18 40 17.94	2.3177	28 18 5.0	2.008
17	16 49 15.35	2.3700	27 4 22.5	5.221	17	18 42 36.90	2.3142	28 16 0.2	2.153
18	16 51 37.59	2.3712	27 9 31.1	5.067	18	18 44 55.64	2.3106	28 13 46.6	2.298
19	16 53 59.90	2.3723	27 14 30.5	4.912	19	18 47 14.17	2.3070	28 11 24.4	2.442
20	16 56 22.27	2.3733	27 19 20.5	4.756	20	18 49 32.48	2.3033	28 8 53.6	2.585
21	16 58 44.70	2.3743	27 24 1.2	4.600	21	18 51 50.57	2.2996	28 6 14.2	2.727
22	17 1 7.19	2.3752	27 28 32.5	4.444	22	18 54 8.43	2.2957	28 3 26.3	2.868
23	17 3 29.72	2.3758	27 32 54.5	4.289	23	18 56 26.05	2.2918	28 0 30.0	3.008
24	17 5 52.29	2.3765	S.27 37 7.2	4.133	24	18 58 43.44	2.2878	S.27 57 25.3	3.148

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	WEDNESDAY 13.					FRIDAY 15.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	18 58 43.44	2.2878	S.27 57 25.3	3.148	0	20 43 4.14	2.0514	S.23 1 14.4	8.843
1	19 1 0.59	2.2838	27 54 12.2	3.288	1	20 45 7.07	2.0463	22 52 20.9	8.939
2	19 3 17.49	2.2796	27 50 50.7	3.427	2	20 47 9.70	2.0413	22 43 21.7	9.034
3	19 5 34.14	2.2754	27 47 21.0	3.564	3	20 49 12.03	2.0363	22 34 16.8	9.129
4	19 7 50.54	2.2712	27 43 43.0	3.701	4	20 51 14.06	2.0313	22 25 6.2	9.222
5	19 10 6.68	2.2668	27 39 56.9	3.837	5	20 53 15.78	2.0263	22 15 50.1	9.314
6	19 12 22.56	2.2625	27 36 2.6	3.973	6	20 55 17.21	2.0213	22 6 28.5	9.406
7	19 14 38.18	2.2581	27 32 0.2	4.107	7	20 57 18.34	2.0163	21 57 1.4	9.497
8	19 16 53.53	2.2536	27 27 49.8	4.240	8	20 59 19.17	2.0114	21 47 28.8	9.587
9	19 19 8.61	2.2491	27 23 31.4	4.373	9	21 1 19.71	2.0066	21 37 50.9	9.676
10	19 21 23.42	2.2445	27 19 5.0	4.505	10	21 3 19.96	2.0017	21 28 7.7	9.764
11	19 23 37.95	2.2398	27 14 30.8	4.636	11	21 5 19.92	1.9969	21 18 19.2	9.852
12	19 25 52.20	2.2352	27 9 48.7	4.766	12	21 7 19.59	1.9922	21 8 25.5	9.938
13	19 28 6.17	2.2304	27 4 58.9	4.895	13	21 9 18.98	1.9874	20 58 26.7	10.023
14	19 30 19.85	2.2256	27 0 1.3	5.024	14	21 11 18.08	1.9827	20 48 22.7	10.108
15	19 32 33.24	2.2208	26 54 56.0	5.152	15	21 13 16.90	1.9781	20 38 13.7	10.192
16	19 34 46.35	2.2160	26 49 43.1	5.278	16	21 15 15.45	1.9735	20 27 59.7	10.274
17	19 36 59.16	2.2110	26 44 22.7	5.403	17	21 17 13.72	1.9688	20 17 40.8	10.357
18	19 39 11.67	2.2061	26 38 54.7	5.528	18	21 19 11.71	1.9643	20 7 16.9	10.438
19	19 41 23.89	2.2012	26 33 19.3	5.652	19	21 21 9.43	1.9598	19 56 48.2	10.518
20	19 43 35.81	2.1962	26 27 36.4	5.776	20	21 23 6.89	1.9554	19 46 14.7	10.598
21	19 45 47.43	2.1912	26 21 46.2	5.898	21	21 25 4.08	1.9510	19 35 36.5	10.677
22	19 47 58.75	2.1861	26 15 48.7	6.019	22	21 27 1.01	1.9466	19 24 53.5	10.755
23	19 50 9.76	2.1810	S.26 9 43.9	6.139	23	21 28 57.67	1.9423	S.19 14 5.9	10.832
	THURSDAY 14.					SATURDAY 16.			
0	19 52 20.47	2.1759	S.26 3 32.0	6.258	0	21 30 54.08	1.9380	S.19 3 13.7	10.908
1	19 54 30.87	2.1708	25 57 12.9	6.377	1	21 32 50.23	1.9338	18 52 17.0	10.983
2	19 56 40.97	2.1657	25 50 46.8	6.494	2	21 34 46.13	1.9297	18 41 15.7	11.058
3	19 58 50.76	2.1605	25 44 13.6	6.611	3	21 36 41.79	1.9256	18 30 10.0	11.132
4	20 1 0.23	2.1553	25 37 33.5	6.727	4	21 38 37.20	1.9214	18 18 59.8	11.206
5	20 3 9.40	2.1502	25 30 46.4	6.842	5	21 40 32.36	1.9173	18 7 45.3	11.278
6	20 5 18.25	2.1449	25 23 52.5	6.955	6	21 42 27.28	1.9134	17 56 26.5	11.349
7	20 7 26.79	2.1398	25 16 51.8	7.067	7	21 44 21.97	1.9095	17 45 3.4	11.420
8	20 9 35.02	2.1346	25 9 44.4	7.179	8	21 46 16.42	1.9057	17 33 36.1	11.490
9	20 11 42.94	2.1293	25 2 30.3	7.291	9	21 48 10.65	1.9019	17 22 4.6	11.559
10	20 13 50.54	2.1241	24 55 9.5	7.401	10	21 50 4.65	1.8981	17 10 29.0	11.627
11	20 15 57.83	2.1188	24 47 42.2	7.509	11	21 51 58.42	1.8944	16 58 49.3	11.695
12	20 18 4.80	2.1136	24 40 8.4	7.617	12	21 53 51.98	1.8908	16 47 5.6	11.762
13	20 20 11.46	2.1084	24 32 28.1	7.725	13	21 55 45.32	1.8872	16 35 17.9	11.828
14	20 22 17.81	2.1032	24 24 41.4	7.832	14	21 57 38.44	1.8837	16 23 26.2	11.893
15	20 24 23.84	2.0979	24 16 48.3	7.937	15	21 59 31.36	1.8803	16 11 30.7	11.958
16	20 26 29.56	2.0928	24 8 49.0	8.041	16	22 1 24.07	1.8768	15 59 31.3	12.022
17	20 28 34.97	2.0876	24 0 43.4	8.144	17	22 3 16.58	1.8735	15 47 28.0	12.086
18	20 30 40.07	2.0824	23 52 31.7	8.247	18	22 5 8.89	1.8702	15 35 21.0	12.148
19	20 32 44.86	2.0772	23 44 13.8	8.349	19	22 7 1.00	1.8669	15 23 10.3	12.209
20	20 34 49.33	2.0720	23 35 49.8	8.450	20	22 8 52.92	1.8638	15 10 55.9	12.270
21	20 36 53.50	2.0668	23 27 19.8	8.549	21	22 10 44.66	1.8607	14 58 37.9	12.330
22	20 38 57.35	2.0617	23 18 43.9	8.648	22	22 12 36.21	1.8577	14 46 16.3	12.389
23	20 41 0.90	2.0566	23 10 2.1	8.746	23	22 14 27.58	1.8547	14 33 51.2	12.448
24	20 43 4.14	2.0514	S.23 1 14.4	8.843	24	22 16 18.77	1.8518	S.14 21 22.5	12.507

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	SUNDAY 17.					TUESDAY 19.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	22 16 18.77	1.8518	S. 14 21 22.5	12.507	0	23 43 9.03	1.7944	S. 3 27 14.2	14.487
1	22 18 9.79	1.8489	14 8 50.4	12.564	1	23 44 56.71	1.7950	3 12 44.3	14.511
2	22 20 0.64	1.8462	13 56 14.8	12.621	2	23 46 44.43	1.7958	2 58 12.9	14.535
3	22 21 51.33	1.8435	13 43 35.9	12.677	3	23 48 32.20	1.7966	2 43 40.1	14.558
4	22 23 41.86	1.8408	13 30 53.6	12.732	4	23 50 20.02	1.7975	2 29 5.9	14.581
5	22 25 32.23	1.8382	13 18 8.0	12.787	5	23 52 7.90	1.7984	2 14 30.4	14.602
6	22 27 22.44	1.8357	13 5 19.2	12.840	6	23 53 55.83	1.7994	1 59 53.7	14.622
7	22 29 12.51	1.8331	12 52 27.2	12.893	7	23 55 43.83	1.8006	1 45 15.7	14.642
8	22 31 2.43	1.8308	12 39 32.0	12.946	8	23 57 31.90	1.8018	1 30 36.6	14.661
9	22 32 52.21	1.8285	12 26 33.7	12.998	9	23 59 20.04	1.8030	1 15 56.4	14.679
10	22 34 41.85	1.8263	12 13 32.3	13.049	10	0 1 8.26	1.8044	1 1 15.1	14.697
11	22 36 31.36	1.8241	12 0 27.8	13.099	11	0 2 56.57	1.8059	0 46 32.7	14.715
12	22 38 20.74	1.8220	11 47 20.4	13.148	12	0 4 44.97	1.8074	0 31 49.3	14.731
13	22 40 10.00	1.8200	11 34 10.0	13.197	13	0 6 33.46	1.8090	0 17 5.0	14.746
14	22 41 59.14	1.8180	11 20 56.7	13.246	14	0 8 22.05	1.8107	S. 0 2 19.8	14.760
15	22 43 48.16	1.8160	11 7 40.5	13.294	15	0 10 10.75	1.8125	N. 0 12 26.2	14.773
16	22 45 37.07	1.8142	10 54 21.4	13.342	16	0 11 59.55	1.8143	0 27 13.0	14.787
17	22 47 25.87	1.8125	10 40 59.5	13.388	17	0 13 48.47	1.8163	0 42 0.6	14.799
18	22 49 14.57	1.8108	10 27 34.9	13.433	18	0 15 37.51	1.8183	0 56 48.9	14.810
19	22 51 3.17	1.8092	10 14 7.5	13.478	19	0 17 26.67	1.8204	1 11 37.8	14.821
20	22 52 51.67	1.8076	10 0 37.5	13.523	20	0 19 15.96	1.8226	1 26 27.4	14.831
21	22 54 40.08	1.8062	9 47 4.8	13.567	21	0 21 5.38	1.8248	1 41 17.5	14.839
22	22 56 28.41	1.8048	9 33 29.5	13.609	22	0 22 54.94	1.8272	1 56 8.1	14.847
23	22 58 16.65	1.8033	S. 9 19 51.7	13.651	23	0 24 44.64	1.8296	N. 2 10 59.2	14.854
	MONDAY 18.					WEDNESDAY 20.			
0	23 0 4.81	1.8021	S. 9 6 11.4	13.692	0	0 26 34.49	1.8322	N. 2 25 50.6	14.860
1	23 1 52.90	1.8009	8 52 28.6	13.733	1	0 28 24.50	1.8348	2 40 42.4	14.866
2	23 3 40.92	1.7998	8 38 43.4	13.773	2	0 30 14.66	1.8374	2 55 34.5	14.870
3	23 5 28.88	1.7988	8 24 55.8	13.813	3	0 32 4.99	1.8402	3 10 26.8	14.873
4	23 7 16.78	1.7978	8 11 5.8	13.853	4	0 33 55.48	1.8430	3 25 19.3	14.876
5	23 9 4.62	1.7969	7 57 13.5	13.891	5	0 35 46.15	1.8460	3 40 11.9	14.877
6	23 10 52.41	1.7961	7 43 18.9	13.928	6	0 37 37.00	1.8490	3 55 4.6	14.878
7	23 12 40.15	1.7953	7 29 22.1	13.965	7	0 39 28.03	1.8521	4 9 57.3	14.878
8	23 14 27.85	1.7947	7 15 23.1	14.002	8	0 41 19.25	1.8553	4 24 50.0	14.877
9	23 16 15.51	1.7941	7 1 21.9	14.038	9	0 43 10.66	1.8585	4 39 42.6	14.875
10	23 18 3.14	1.7936	6 47 18.6	14.072	10	0 45 2.27	1.8619	4 54 35.0	14.872
11	23 19 50.74	1.7932	6 33 13.3	14.106	11	0 46 54.09	1.8652	5 9 27.2	14.868
12	23 21 38.32	1.7928	6 19 5.9	14.140	12	0 48 46.11	1.8688	5 24 19.1	14.863
13	23 23 25.88	1.7925	6 4 56.5	14.173	13	0 50 38.35	1.8725	5 39 10.7	14.857
14	23 25 13.42	1.7923	5 50 45.2	14.204	14	0 52 30.81	1.8762	5 54 1.9	14.849
15	23 27 0.95	1.7922	5 36 32.0	14.235	15	0 54 23.49	1.8799	6 8 52.6	14.841
16	23 28 48.48	1.7921	5 22 17.0	14.267	16	0 56 16.40	1.8838	6 23 42.8	14.832
17	23 30 36.00	1.7921	5 8 0.0	14.297	17	0 58 9.55	1.8878	6 38 32.5	14.822
18	23 32 23.53	1.7922	4 53 41.3	14.326	18	1 0 2.93	1.8918	6 53 21.5	14.811
19	23 34 11.07	1.7924	4 39 20.9	14.355	19	1 1 56.56	1.8959	7 8 9.8	14.799
20	23 35 58.62	1.7927	4 24 58.7	14.382	20	1 3 50.44	1.9002	7 22 57.4	14.787
21	23 37 46.18	1.7929	4 10 35.0	14.409	21	1 5 44.58	1.9045	7 37 44.2	14.772
22	23 39 33.77	1.7933	3 56 9.6	14.436	22	1 7 38.98	1.9088	7 52 30.0	14.756
23	23 41 21.38	1.7938	3 41 42.7	14.462	23	1 9 33.64	1.9132	8 7 14.9	14.739
24	23 43 9.03	1.7944	S. 3 27 14.2	14.487	24	1 11 28.57	1.9177	N. 8 21 58.7	14.721

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	THURSDAY 21.					SATURDAY 23.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	1 11 28.57	1.9177	N. 8 21 58.7	14.721	0	2 50 16.99	2.2267	N.19 23 26.0	12.272
1	1 13 23.77	1.9224	8 36 41.4	14.703	1	2 52 30.83	2.2346	19 35 39.6	12.182
2	1 15 19.26	1.9272	8 51 23.0	14.683	2	2 54 45.14	2.2426	19 47 47.8	12.090
3	1 17 15.03	1.9319	9 6 3.3	14.662	3	2 56 59.94	2.2507	19 59 50.4	11.997
4	1 19 11.09	1.9368	9 20 42.4	14.639	4	2 59 15.22	2.2587	20 11 47.4	11.902
5	1 21 7.45	1.9418	9 35 20.0	14.615	5	3 1 30.98	2.2668	20 23 38.6	11.803
6	1 23 4.11	1.9468	9 49 56.2	14.591	6	3 3 47.23	2.2749	20 35 23.8	11.704
7	1 25 1.07	1.9519	10 4 30.9	14.565	7	3 6 3.97	2.2831	20 47 3.1	11.604
8	1 26 58.34	1.9572	10 19 4.0	14.537	8	3 8 21.20	2.2913	20 58 36.3	11.502
9	1 28 55.93	1.9625	10 33 35.4	14.508	9	3 10 38.92	2.2994	21 10 3.3	11.397
10	1 30 53.84	1.9678	10 48 5.0	14.478	10	3 12 57.13	2.3076	21 21 23.9	11.290
11	1 32 52.07	1.9733	11 2 32.8	14.448	11	3 15 15.83	2.3158	21 32 38.1	11.182
12	1 34 50.64	1.9789	11 16 58.8	14.416	12	3 17 35.03	2.3241	21 43 45.7	11.071
13	1 36 49.54	1.9844	11 31 22.7	14.382	13	3 19 54.72	2.3323	21 54 46.6	10.959
14	1 38 48.77	1.9901	11 45 44.6	14.347	14	3 22 14.91	2.3406	22 5 40.8	10.845
15	1 40 48.35	1.9959	12 0 4.4	14.311	15	3 24 35.59	2.3488	22 16 28.0	10.729
16	1 42 48.28	2.0018	12 14 21.9	14.273	16	3 26 56.77	2.3571	22 27 8.3	10.612
17	1 44 48.57	2.0078	12 28 37.2	14.234	17	3 29 18.44	2.3653	22 37 41.4	10.492
18	1 46 49.21	2.0138	12 42 50.0	14.193	18	3 31 40.60	2.3735	22 48 7.3	10.371
19	1 48 50.22	2.0198	12 57 0.4	14.152	19	3 34 3.26	2.3817	22 58 25.9	10.247
20	1 50 51.59	2.0260	13 11 8.3	14.109	20	3 36 26.41	2.3899	23 8 37.0	10.122
21	1 52 53.34	2.0323	13 25 13.5	14.064	21	3 38 50.05	2.3981	23 18 40.5	9.995
22	1 54 55.47	2.0387	13 39 16.0	14.018	22	3 41 14.18	2.4063	23 28 36.4	9.866
23	1 56 57.98	2.0450	N.13 53 15.7	13.971	23	3 43 38.80	2.4144	N.23 38 24.4	9.734
	FRIDAY 22.					SUNDAY 24.			
0	1 59 0.87	2.0515	N.14 7 12.5	13.922	0	3 46 3.91	2.4226	N.23 48 4.5	9.602
1	2 1 4.16	2.0581	14 21 6.3	13.872	1	3 48 29.51	2.4307	23 57 36.6	9.468
2	2 3 7.84	2.0647	14 34 57.1	13.820	2	3 50 55.59	2.4387	24 7 0.6	9.331
3	2 5 11.92	2.0713	14 48 44.7	13.766	3	3 53 22.16	2.4467	24 16 16.3	9.192
4	2 7 16.40	2.0781	15 2 29.0	13.711	4	3 55 49.20	2.4547	24 25 23.6	9.052
5	2 9 21.29	2.0850	15 16 10.0	13.655	5	3 58 16.72	2.4627	24 34 22.5	8.910
6	2 11 26.60	2.0919	15 29 47.6	13.597	6	4 0 44.72	2.4706	24 43 12.8	8.766
7	2 13 32.32	2.0989	15 43 21.6	13.537	7	4 3 13.19	2.4783	24 51 54.4	8.620
8	2 15 38.47	2.1060	15 56 52.0	13.476	8	4 5 42.12	2.4861	25 0 27.2	8.472
9	2 17 45.04	2.1130	16 10 18.7	13.413	9	4 8 11.52	2.4938	25 8 51.1	8.323
10	2 19 52.03	2.1202	16 23 41.6	13.348	10	4 10 41.38	2.5014	25 17 6.0	8.172
11	2 21 59.46	2.1275	16 37 0.5	13.283	11	4 13 11.69	2.5089	25 25 11.7	8.018
12	2 24 7.33	2.1348	16 50 15.5	13.216	12	4 15 42.45	2.5164	25 33 8.2	7.864
13	2 26 15.63	2.1421	17 3 26.4	13.146	13	4 18 13.66	2.5239	25 40 55.4	7.707
14	2 28 24.38	2.1496	17 16 33.0	13.075	14	4 20 45.32	2.5312	25 48 33.1	7.549
15	2 30 33.58	2.1570	17 29 35.4	13.003	15	4 23 17.41	2.5384	25 56 1.3	7.390
16	2 32 43.22	2.1645	17 42 33.3	12.928	16	4 25 49.93	2.5455	26 3 19.9	7.228
17	2 34 53.32	2.1722	17 55 26.7	12.852	17	4 28 22.87	2.5526	26 10 28.7	7.064
18	2 37 3.88	2.1798	18 8 15.5	12.775	18	4 30 56.24	2.5596	26 17 27.6	6.899
19	2 39 14.90	2.1875	18 20 59.7	12.696	19	4 33 30.02	2.5664	26 24 16.6	6.733
20	2 41 26.38	2.1952	18 33 39.0	12.614	20	4 36 4.21	2.5732	26 30 55.6	6.566
21	2 43 38.33	2.2030	18 46 13.4	12.532	21	4 38 38.80	2.5798	26 37 24.5	6.396
22	2 45 50.74	2.2108	18 58 42.8	12.447	22	4 41 13.78	2.5863	26 43 43.1	6.224
23	2 48 3.63	2.2187	19 11 7.0	12.360	23	4 43 49.15	2.5927	26 49 51.4	6.052
24	2 50 16.99	2.2267	N.19 23 26.0	12.272	24	4 46 24.90	2.5990	N.26 55 49.3	5.878

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	MONDAY 25.					WEDNESDAY 27.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	4 46 24.90	2.5990	N.26 55 49.3	5.878	0	6 55 16.29	2.6978	N.27 57 25.0	3.500
1	4 49 1.03	2.6051	27 1 36.7	5.701	1	6 57 58.08	2.6952	27 53 49.1	3.698
2	4 51 37.51	2.6110	27 7 13.4	5.523	2	7 0 39.71	2.6923	27 50 1.3	3.895
3	4 54 14.35	2.6169	27 12 39.5	5.345	3	7 3 21.16	2.6893	27 46 1.7	4.091
4	4 56 51.54	2.6227	27 17 54.8	5.165	4	7 6 2.42	2.6861	27 41 50.4	4.286
5	4 59 29.07	2.6283	27 22 59.3	4.984	5	7 8 43.49	2.6828	27 37 27.4	4.481
6	5 2 6.93	2.6338	27 27 52.9	4.801	6	7 11 24.36	2.6793	27 32 52.7	4.674
7	5 4 45.12	2.6390	27 32 35.4	4.617	7	7 14 5.01	2.6756	27 28 6.4	4.867
8	5 7 23.61	2.6441	27 37 6.9	4.432	8	7 16 45.43	2.6718	27 23 8.6	5.059
9	5 10 2.41	2.6492	27 41 27.2	4.245	9	7 19 25.62	2.6678	27 17 59.3	5.250
10	5 12 41.51	2.6541	27 45 36.3	4.057	10	7 22 5.56	2.6636	27 12 38.6	5.440
11	5 15 20.89	2.6586	27 49 34.1	3.869	11	7 24 45.25	2.6593	27 7 6.5	5.629
12	5 18 0.54	2.6631	27 53 20.6	3.679	12	7 27 24.68	2.6548	27 1 23.1	5.817
13	5 20 40.46	2.6675	27 56 55.6	3.488	13	7 30 3.83	2.6502	26 55 28.5	6.003
14	5 23 20.63	2.6716	28 0 19.2	3.297	14	7 32 42.70	2.6455	26 49 22.7	6.189
15	5 26 1.05	2.6755	28 3 31.2	3.103	15	7 35 21.29	2.6407	26 43 5.8	6.373
16	5 28 41.70	2.6793	28 6 31.6	2.909	16	7 37 59.58	2.6356	26 36 38.0	6.555
17	5 31 22.57	2.6829	28 9 20.3	2.715	17	7 40 37.56	2.6304	26 29 59.2	6.737
18	5 34 3.65	2.6864	28 11 57.4	2.520	18	7 43 15.23	2.6252	26 23 9.6	6.917
19	5 36 44.94	2.6897	28 14 22.7	2.323	19	7 45 52.58	2.6198	26 16 9.2	7.097
20	5 39 26.41	2.6927	28 16 36.2	2.126	20	7 48 29.60	2.6143	26 8 58.0	7.274
21	5 42 8.06	2.6955	28 18 37.8	1.928	21	7 51 6.29	2.6086	26 1 36.3	7.448
22	5 44 49.87	2.6982	28 20 27.6	1.731	22	7 53 42.63	2.6028	25 54 4.1	7.623
23	5 47 31.84	2.7007	N.28 22 5.5	1.532	23	7 56 18.63	2.5971	N.25 46 21.4	7.798
	TUESDAY 26.					THURSDAY 28.			
0	5 50 13.95	2.7029	N.28 23 31.4	1.332	0	7 58 54.28	2.5911	N.25 38 28.3	7.970
1	5 52 56.19	2.7050	28 24 45.3	1.132	1	8 1 29.56	2.5850	25 30 25.0	8.139
2	5 55 38.55	2.7068	28 25 47.2	0.931	2	8 4 4.48	2.5789	25 22 11.6	8.308
3	5 58 21.01	2.7085	28 26 37.0	0.730	3	8 6 39.03	2.5727	25 13 48.1	8.475
4	6 1 3.57	2.7101	28 27 14.8	0.529	4	8 9 13.20	2.5663	25 5 14.6	8.641
5	6 3 46.22	2.7114	28 27 40.5	0.327	5	8 11 46.99	2.5600	24 56 31.2	8.805
6	6 6 28.94	2.7125	28 27 54.0	+0.125	6	8 14 20.40	2.5536	24 47 38.0	8.967
7	6 9 11.72	2.7133	28 27 55.5	−0.077	7	8 16 53.42	2.5470	24 38 35.1	9.128
8	6 11 54.54	2.7140	28 27 44.8	0.280	8	8 19 26.04	2.5404	24 29 22.6	9.287
9	6 14 37.40	2.7146	28 27 21.9	0.482	9	8 21 58.27	2.5338	24 20 0.6	9.444
10	6 17 20.29	2.7148	28 26 46.9	0.684	10	8 24 30.10	2.5271	24 10 29.3	9.600
11	6 20 3.18	2.7149	28 25 59.8	0.887	11	8 27 1.52	2.5203	24 0 48.7	9.754
12	6 22 46.08	2.7148	28 25 0.5	1.090	12	8 29 32.54	2.5135	23 50 58.8	9.907
13	6 25 28.96	2.7144	28 23 49.0	1.292	13	8 32 3.14	2.5066	23 40 59.9	10.057
14	6 28 11.81	2.7138	28 22 25.4	1.494	14	8 34 33.33	2.4997	23 30 52.0	10.206
15	6 30 54.62	2.7131	28 20 49.7	1.697	15	8 37 3.10	2.4927	23 20 35.2	10.353
16	6 33 37.38	2.7122	28 19 1.8	1.899	16	8 39 32.45	2.4857	23 10 9.7	10.498
17	6 36 20.08	2.7111	28 17 1.8	2.100	17	8 42 1.38	2.4787	22 59 35.5	10.641
18	6 39 2.71	2.7098	28 14 49.8	2.301	18	8 44 29.89	2.4717	22 48 52.8	10.783
19	6 41 45.25	2.7083	28 12 25.7	2.502	19	8 46 57.98	2.4646	22 38 1.6	10.923
20	6 44 27.70	2.7066	28 9 49.5	2.703	20	8 49 25.64	2.4574	22 27 2.0	11.062
21	6 47 10.04	2.7046	28 7 1.3	2.903	21	8 51 52.87	2.4503	22 15 54.2	11.198
22	6 49 52.25	2.7025	28 4 1.2	3.102	22	8 54 19.68	2.4433	22 4 38.3	11.332
23	6 52 34.34	2.7003	28 0 49.1	3.302	23	8 56 46.06	2.4362	21 53 14.4	11.464
24	6 55 16.29	2.6978	N.27 57 25.0	3.500	24	8 59 12.02	2.4290	N.21 41 42.6	11.595

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
		FRIDAY 29.		
	h m s	s	° ′ ″	″
0	8 59 12.02	2.4290	N.21 41 42.6	11.595
1	9 1 37.54	2.4218	21 30 3.0	11.723
2	9 4 2.64	2.4147	21 18 15.8	11.850
3	9 6 27.31	2.4076	21 6 21.0	11.976
4	9 8 51.55	2.4004	20 54 18.7	12.100
5	9 11 15.36	2.3933	20 42 9.0	12.222
6	9 13 38.75	2.3863	20 29 52.1	12.341
7	9 16 1.71	2.3792	20 17 28.1	12.458
8	9 18 24.25	2.3721	20 4 57.1	12.575
9	9 20 46.36	2.3651	19 52 19.1	12.690
10	9 23 8.06	2.3581	19 39 34.3	12.803
11	9 25 29.33	2.3510	19 26 42.8	12.913
12	9 27 50.18	2.3441	19 13 44.8	13.021
13	9 30 10.62	2.3372	19 0 40.3	13.128
14	9 32 30.64	2.3303	18 47 29.5	13.233
15	9 34 50.25	2.3234	18 34 12.4	13.337
16	9 37 9.45	2.3166	18 20 49.1	13.438
17	9 39 28.24	2.3098	18 7 19.8	13.538
18	9 41 46.63	2.3032	17 53 44.6	13.636
19	9 44 4.62	2.2965	17 40 3.5	13.732
20	9 46 22.21	2.2899	17 26 16.8	13.826
21	9 48 39.41	2.2833	17 12 24.4	13.918
22	9 50 56.21	2.2768	16 58 26.6	14.008
23	9 53 12.62	2.2703	N.16 44 23.4	14.098
		SATURDAY 30.		
0	9 55 28.65	2.2639	N.16 30 14.8	14.186
1	9 57 44.29	2.2576	16 16 1.1	14.270
2	9 59 59.56	2.2513	16 1 42.4	14.353
3	10 2 14.45	2.2451	15 47 18.7	14.436
4	10 4 28.97	2.2390	15 32 50.1	14.516
5	10 6 43.13	2.2329	15 18 16.8	14.594
6	10 8 56.92	2.2269	15 3 38.8	14.671
7	10 11 10.36	2.2210	14 48 56.3	14.746
8	10 13 23.44	2.2151	14 34 9.3	14.819
9	10 15 36.17	2.2093	14 19 18.0	14.891
10	10 17 48.55	2.2035	14 4 22.4	14.961
11	10 20 0.59	2.1979	13 49 22.7	15.029
12	10 22 12.30	2.1923	13 34 18.9	15.096
13	10 24 23.67	2.1868	13 19 11.2	15.160
14	10 26 34.72	2.1814	13 3 59.7	15.223
15	10 28 45.44	2.1761	12 48 44.4	15.285
16	10 30 55.85	2.1708	12 33 25.5	15.345
17	10 33 5.94	2.1656	12 18 3.0	15.403
18	10 35 15.72	2.1605	12 2 37.1	15.460
19	10 37 25.20	2.1555	11 47 7.8	15.515
20	10 39 34.38	2.1506	11 31 35.3	15.568
21	10 41 43.27	2.1458	11 15 59.6	15.621
22	10 43 51.87	2.1410	11 0 20.8	15.672
23	10 46 0.19	2.1363	10 44 39.0	15.720
24	10 48 8.23	2.1317	N.10 28 54.4	15.767
		SUNDAY, DECEMBER 1.		
	h m s	s	° ′ ″	″
0	10 48 8.23	2.1317	N.10 28 54.4	15.767

PHASES OF THE MOON.

			d h m
☾	Last Quarter	Nov.	1 15 37.6
●	New Moon		8 14 4.8
☽	First Quarter		16 10 43.3
○	Full Moon		24 4 12.2
☾	Last Quarter		30 23 4.8

			d h
☾	Perigee	Nov.	2 22.9
☾	Apogee		15 22.5
☾	Perigee		27 22.7

AT GREENWICH APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S					Sidereal Time of Semidiameter Passing Meridian.	Equation of Time, to be Subtracted from Added to Apparent Time.	Diff. for 1 Hour.
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.	Semidiameter.			
		h m s	s	° ′ ″	″	′ ″	s	m s	s
SUN.	1	16 28 56.08	10.795	S. 21 48 11.5	−23.44	16 15.39	70.25	10 55.93	0.936
Mon.	2	16 33 15.52	10.823	21 57 21.5	22.40	16 15.53	70.33	10 33.12	0.964
Tues.	3	16 37 35.60	10.850	22 6 6.2	21.34	16 15.67	70.41	10 9.66	0.990
Wed.	4	16 41 56.29	10.875	22 14 25.3	−20.27	16 15.81	70.49	9 45.58	1.015
Thur.	5	16 46 17.59	10.899	22 22 18.6	19.18	16 15.94	70.57	9 20.91	1.039
Frid.	6	16 50 39.46	10.923	22 29 45.7	18.08	16 16.07	70.64	8 55.67	1.063
Sat.	7	16 55 1.87	10.945	22 36 46.5	−16.97	16 16.20	70.71	8 29.89	1.085
SUN.	8	16 59 24.79	10.965	22 43 20.7	15.86	16 16.32	70.78	8 3.61	1.105
Mon.	9	17 3 48.18	10.984	22 49 28.0	14.74	16 16.44	70.85	7 36.85	1.124
Tues.	10	17 8 12.01	11.001	22 55 8.2	−13.61	16 16.56	70.91	7 9.65	1.141
Wed.	11	17 12 36.25	11.018	23 0 21.2	12.47	16 16.67	70.96	6 42.05	1.157
Thur.	12	17 17 0.87	11.033	23 5 6.8	11.33	16 16.78	71.01	6 14.06	1.173
Frid.	13	17 21 25.82	11.047	23 9 24.8	−10.18	16 16.89	71.05	5 45.74	1.186
Sat.	14	17 25 51.08	11.059	23 13 15.1	9.02	16 16.99	71.09	5 17.11	1.198
SUN.	15	17 30 16.63	11.070	23 16 37.6	7.85	16 17.09	71.13	4 48.21	1.209
Mon.	16	17 34 42.41	11.079	23 19 32.2	− 6.69	16 17.18	71.16	4 19.07	1.218
Tues.	17	17 39 8.40	11.087	23 21 58.8	5.52	16 17.27	71.19	3 49.72	1.226
Wed.	18	17 43 34.56	11.093	23 23 57.2	4.35	16 17.36	71.22	3 20.20	1.232
Thur.	19	17 48 0.85	11.098	23 25 27.5	− 3.18	16 17.44	71.24	2 50.54	1.237
Frid.	20	17 52 27.26	11.102	23 26 29.6	2.00	16 17.51	71.25	2 20.78	1.241
Sat.	21	17 56 53.74	11.104	23 27 3.4	− 0.82	16 17.58	71.26	1 50.95	1.244
SUN.	22	18 1 20.26	11.105	23 27 8.9	+ 0.36	16 17.64	71.27	1 21.07	1.245
Mon.	23	18 5 46.78	11.105	23 26 46.2	1.54	16 17.69	71.27	0 51.18	1.245
Tues.	24	18 10 13.29	11.103	23 25 55.2	2.71	16 17.74	71.26	0 21.31	1.243
Wed.	25	18 14 39.77	11.101	23 24 36.0	+ 3.88	16 17.78	71.25	0 8.52	1.241
Thur.	26	18 19 6.16	11.097	23 22 48.6	5.06	16 17.81	71.24	0 38.27	1.237
Frid.	27	18 23 32.44	11.092	23 20 33.0	6.23	16 17.83	71.22	1 7.91	1.232
Sat.	28	18 27 58.59	11.086	23 17 49.3	+ 7.40	16 17.85	71.20	1 37.43	1.226
SUN.	29	18 32 24.58	11.079	23 14 37.5	8.57	16 17.87	71.17	2 6.78	1.218
Mon.	30	18 36 50.38	11.070	23 10 57.7	9.74	16 17.89	71.14	2 35.93	1.210
Tues.	31	18 41 15.94	11.060	23 6 50.0	10.90	16 17.89	71.10	3 4.86	1.199
Wed.	32	18 45 41.24	11.050	S. 23 2 14.8	+12.06	16 17.89	71.06	3 33.52	1.187

Note.—The mean time of semidiameter passing may be found by subtracting $0^s.19$ from the sidereal time.

The sign − prefixed to the hourly change of declination indicates that south declinations are increasing; the sign + indicates that south declinations are decreasing.

AT GREENWICH MEAN NOON.

Day of the Week.	Day of the Month.	THE SUN'S				Equation of Time, to be Added to Subtracted from Mean Time.	Diff. for 1 Hour.	Sidereal Time, or Right Ascension of Mean Sun.
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.			
		h m s	s	° ′ ″	″	m s	s	h m s
SUN.	1	16 28 58.05	10.793	S. 21 48 15.7	−23.42	10 55.76	0.936	16 39 53.81
Mon.	2	16 33 17.42	10.820	21 57 25.4	22.38	10 32.95	0.964	16 43 50.36
Tues.	3	16 37 37.43	10.847	22 6 9.8	21.32	10 9.49	0.990	16 47 46.92
Wed.	4	16 41 58.06	10.872	22 14 28.6	−20.25	9 45.42	1.015	16 51 43.48
Thur.	5	16 46 19.29	10.896	22 22 21.6	19.16	9 20.75	1.039	16 55 40.04
Frid.	6	16 50 41.08	10.919	22 29 48.4	18.06	8 55.51	1.063	16 59 36.60
Sat.	7	16 55 3.42	10.941	22 36 48.9	−16.96	8 29.74	1.085	17 3 33.16
SUN.	8	16 59 26.26	10.961	22 43 22.7	15.85	8 3.46	1.105	17 7 29.72
Mon.	9	17 3 49.57	10.980	22 49 29.8	14.73	7 36.71	1.124	17 11 26.28
Tues.	10	17 8 13.32	10.997	22 55 9.8	−13.60	7 9.52	1.141	17 15 22.83
Wed.	11	17 12 37.48	11.014	23 0 22.6	12.46	6 41.92	1.157	17 19 19.39
Thur.	12	17 17 2.01	11.029	23 5 8.0	11.32	6 13.94	1.173	17 23 15.95
Frid.	13	17 21 26.88	11.043	23 9 25.8	−10.17	5 45.63	1.186	17 27 12.51
Sat.	14	17 25 52.06	11.055	23 13 15.9	9.01	5 17.01	1.198	17 31 9.07
SUN.	15	17 30 17.52	11.066	23 16 38.2	7.84	4 48.11	1.209	17 35 5.63
Mon.	16	17 34 43.21	11.075	23 19 32.7	− 6.68	4 18.98	1.218	17 39 2.19
Tues.	17	17 39 9.11	11.083	23 21 59.2	5.51	3 49.64	1.226	17 42 58.75
Wed.	18	17 43 35.18	11.089	23 23 57.5	4.34	3 20.13	1.232	17 46 55.31
Thur.	19	17 48 1.39	11.094	23 25 27.7	− 3.17	2 50.48	1.237	17 50 51.86
Frid.	20	17 52 27.70	11.098	23 26 29.6	1.99	2 20.73	1.241	17 54 48.42
Sat.	21	17 56 54.09	11.100	23 27 3.4	− 0.82	1 50.91	1.244	17 58 44.98
SUN.	22	18 1 20.51	11.101	23 27 8.9	+ 0.36	1 21.04	1.245	18 2 41.54
Mon.	23	18 5 46.94	11.101	23 26 46.2	1.54	0 51.16	1.245	18 6 38.10
Tues.	24	18 10 13.36	11.099	23 25 55.2	2.71	0 21.30	1.243	18 10 34.66
Wed.	25	18 14 39.74	11.097	23 24 36.0	+ 3.88	0 8.52	1.241	18 14 31.22
Thur.	26	18 19 6.04	11.094	23 22 48.7	5.06	0 38.26	1.237	18 18 27.78
Frid.	27	18 23 32.23	11.089	23 20 33.2	6.23	1 7.89	1.232	18 22 24.34
Sat.	28	18 27 58.29	11.082	23 17 49.5	+ 7.40	1 37.40	1.226	18 26 20.90
SUN.	29	18 32 24.19	11.075	23 14 37.8	8.57	2 6.74	1.218	18 30 17.46
Mon.	30	18 36 49.90	11.067	23 10 58.2	9.73	2 35.88	1.210	18 34 14.02
Tues.	31	18 41 15.37	11.057	23 6 50.7	10.89	3 4.80	1.199	18 38 10.58
Wed.	32	18 45 40.58	11.046	S. 23 2 15.5	+12.05	3 33.45	1.187	18 42 7.14

Note.—The semidiameter for mean noon may be assumed the same as that for apparent noon. The sign − prefixed to the hourly change of declination indicates that south declinations are increasing; the sign + indicates that south declinations are decreasing.

Diff. for 1 Hour, $+9^s.8565$. (Table III.)

AT GREENWICH MEAN NOON.

Day of the Month.	Day of the Year.	THE SUN'S				Logarithm of the Radius Vector of the Earth.	Diff. for 1 Hour.	Mean Time of Sidereal Noon.
		True Longitude.		Diff. for 1 Hour.	Latitude.			
		λ	λ'					
		° ′ ″	′ ″	″	″			h m s
1	336	248 57 24.4	56 42.0	152.13	+0.37	9.993 7719	−27.2	7 18 54.10
2	337	249 58 16.2	57 33.6	152.19	0.25	9.993 7076	26.4	7 14 58.18
3	338	250 59 9.5	58 26.7	152.25	+0.11	9.993 6451	25.7	7 11 2.27
4	339	251 60 4.1	59 21.1	152.30	−0.02	9.993 5842	−25.0	7 7 6.36
5	340	253 1 0.0	0 16.8	152.35	0.15	9.993 5248	24.4	7 3 10.44
6	341	254 1 57.1	1 13.7	152.40	0.27	9.993 4669	23.8	6 59 14.53
7	342	255 2 55.3	2 11.7	152.45	−0.36	9.993 4105	−23.2	6 55 18.62
8	343	256 3 54.6	3 10.8	152.49	0.44	9.993 3556	22.6	6 51 22.70
9	344	257 4 54.8	4 10.8	152.52	0.49	9.993 3021	22.0	6 47 26.79
10	345	258 5 55.8	5 11.6	152.56	−0.51	9.993 2500	−21.4	6 43 30.88
11	346	259 6 57.6	6 13.2	152.59	0.50	9.993 1995	20.7	6 39 34.97
12	347	260 8 0.0	7 15.5	152.62	0.47	9.993 1506	20.0	6 35 39.05
13	348	261 9 3.0	8 18.3	152.64	−0.41	9.993 1034	−19.3	6 31 43.14
14	349	262 10 6.6	9 21.7	152.66	0.33	9.993 0580	18.5	6 27 47.23
15	350	263 11 10.7	10 25.6	152.68	0.23	9.993 0145	17.7	6 23 51.31
16	351	264 12 15.2	11 29.9	152.69	−0.13	9.992 9730	−16.8	6 19 55.40
17	352	265 13 20.0	12 34.5	152.71	−0.01	9.992 9337	15.9	6 15 59.49
18	353	266 14 25.2	13 39.4	152.72	+0.12	9.992 8966	15.0	6 12 3.57
19	354	267 15 30.6	14 44.7	152.73	+0.24	9.992 8619	−14.0	6 8 7.66
20	355	268 16 36.3	15 50.2	152.74	0.35	9.992 8296	12.9	6 4 11.75
21	356	269 17 42.3	16 56.0	152.76	0.45	9.992 8000	11.8	6 0 15.83
22	357	270 18 48.6	18 2.1	152.77	+0.52	9.992 7731	−10.6	5 56 19.92
23	358	271 19 55.2	19 8.5	152.78	0.57	9.992 7490	9.4	5 52 24.01
24	359	272 21 2.1	20 15.2	152.80	0.59	9.992 7278	8.2	5 48 28.10
25	360	273 22 9.3	21 22.2	152.81	+0.57	9.992 7096	− 7.0	5 44 32.18
26	361	274 23 17.0	22 29.6	152.83	0.52	9.992 6943	5.8	5 40 36.27
27	362	275 24 25.1	23 37.5	152.85	0.44	9.992 6818	4.6	5 36 40.36
28	363	276 25 33.6	24 45.9	152.87	+0.35	9.992 6720	− 3.5	5 32 44.44
29	364	277 26 42.6	25 54.7	152.89	0.23	9.992 6648	2.5	5 28 48.53
30	365	278 27 52.1	27 4.0	152.90	+0.09	9.992 6601	1.5	5 24 52.62
31	366	279 29 2.0	28 13.7	152.92	−0.05	9.992 6577	− 0.5	5 20 56.70
32	367	280 30 12.2	29 23.7	152.93	−0.18	9.992 6576	+ 0.4	5 17 0.79

NOTE.—The longitudes in the column λ are referred to the true equinox of their own date, while those in the column λ' are referred to the mean equinox of the beginning of the Besselian fictitious year.

Diff. for 1 Hour,
$-9^s.8296$.
(Table II.)

GREENWICH MEAN TIME.

Day of the Month.	THE MOON'S								
	SEMIDIAMETER.		HORIZONTAL PARALLAX.				UPPER TRANSIT.		AGE.
	Noon.	Midnight.	Noon.	Diff. for 1 Hour.	Midnight.	Diff. for 1 Hour.	Meridian of Greenwich.	Diff. for 1 Hour.	Noon.
	′ ″	′ ″	′ ″	″	′ ″	″	h m	m	d
1	16 7.5	16 4.8	59 4.8	−0.77	58 55.1	−0.84	18 44.4	1.96	22.4
2	16 2.0	15 59.0	58 44.7	0.90	58 33.6	0.95	19 30.8	1.92	23.4
3	15 55.8	15 52.5	58 22.0	0.99	58 9.9	1.03	20 16.8	1.93	24.4
4	15 49.1	15 45.5	57 57.3	−1.07	57 44.2	−1.11	21 3.8	2.00	25.4
5	15 41.8	15 38.0	57 30.6	1.15	57 16.7	1.18	21 52.8	2.09	26.4
6	15 34.1	15 30.1	57 2.4	1.21	56 47.7	1.24	22 44.2	2.19	27.4
7	15 26.0	15 21.9	56 32.7	−1.25	56 17.6	−1.26	23 37.9	2.27	28.4
8	15 17.8	15 13.7	56 2.5	1.26	55 47.4	1.24	6	. .	29.4
9	15 9.7	15 5.8	55 32.7	1.21	55 18.5	1.16	0 32.8	2.29	0.8
10	15 2.1	14 58.7	55 5.0	−1.09	54 52.4	−1.01	1 27.3	2.24	1.8
11	14 55.6	14 52.8	54 40.9	0.90	54 30.8	0.78	2 19.7	2.12	2.8
12	14 50.5	14 48.7	54 22.3	0.64	54 15.6	0.48	3 8.9	1.98	3.8
13	14 47.4	14 46.7	54 10.9	−0.30	54 8.3	−0.12	3 54.8	1.85	4.8
14	14 46.6	14 47.2	54 8.1	+0.08	54 10.3	+0.29	4 37.8	1.74	5.8
15	14 48.5	14 50.5	54 15.0	0.50	54 22.3	0.72	5 18.5	1.67	6.8
16	14 53.2	14 56.6	54 32.2	+0.94	54 44.7	+1.15	5 58.2	1.65	7.8
17	15 0.7	15 5.5	54 59.8	1.36	55 17.3	1.56	6 38.0	1.67	8.8
18	15 10.9	15 16.8	55 37.1	1.74	55 58.9	1.90	7 19.1	1.76	9.8
19	15 23.2	15 30.0	56 22.5	+2.03	56 47.5	+2.13	8 3.1	1.91	10.8
20	15 37.1	15 44.4	57 13.5	2.19	57 40.0	2.21	8 51.2	2.11	11.8
21	15 51.6	15 58.6	58 6.5	2.19	58 32.4	2.12	9 44.6	2.35	12.8
22	16 5.3	16 11.6	58 57.1	+2.00	59 20.1	+1.82	10 43.8	2.58	13.8
23	16 17.3	16 22.1	59 40.7	1.60	59 58.4	1.34	11 47.6	2.72	14.8
24	16 26.0	16 28.9	60 12.8	1.05	60 23.4	0.73	12 53.1	2.71	15.8
25	16 30.8	16 31.6	60 30.2	+0.40	60 33.1	+0.08	13 56.8	2.58	16.8
26	16 31.3	16 30.0	60 32.1	−0.24	60 27.4	−0.54	14 56.4	2.38	17.8
27	16 27.8	16 24.8	60 19.4	0.80	60 8.4	1.03	15 51.0	2.18	18.8
28	16 21.1	16 16.8	59 54.8	−1.22	59 39.2	−1.37	16 41.5	2.03	19.8
29	16 12.2	16 7.2	59 22.0	1.48	59 3.7	1.56	17 29.1	1.95	20.8
30	16 2.0	15 56.7	58 44.7	1.60	58 25.4	1.62	18 15.4	1.92	21.8
31	15 51.5	15 46.2	58 6.0	1.61	57 46.9	1.58	19 1.8	1.95	22.8
32	15 41.1	15 36.2	57 28.1	−1.54	57 9.9	−1.49	19 49.6	2.04	23.8

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
SUNDAY 1.					TUESDAY 3.				
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	10 48 8.23	2.1317	N. 10 28 54.4	15.767	0	12 26 54.59	2.0192	S. 2 34 20.4	16.337
1	10 50 16.00	2.1272	10 13 7.0	15.812	1	12 28 55.74	2.0192	2 50 40.0	16.316
2	10 52 23.50	2.1228	9 57 16.9	15.856	2	12 30 56.89	2.0192	3 6 58.3	16.293
3	10 54 30.74	2.1185	9 41 24.3	15.898	3	12 32 58.04	2.0193	3 23 15.2	16.270
4	10 56 37.72	2.1143	9 25 29.1	15.940	4	12 34 59.20	2.0194	3 39 30.7	16.246
5	10 58 44.45	2.1102	9 9 31.5	15.979	5	12 37 0.37	2.0197	3 55 44.7	16.219
6	11 0 50.94	2.1061	8 53 31.6	16.017	6	12 39 1.56	2.0200	4 11 57.0	16.192
7	11 2 57.18	2.1021	8 37 29.5	16.053	7	12 41 2.77	2.0203	4 28 7.7	16.163
8	11 5 3.19	2.0983	8 21 25.2	16.088	8	12 43 4.00	2.0208	4 44 16.6	16.133
9	11 7 8.97	2.0945	8 5 18.9	16.122	9	12 45 5.27	2.0214	5 0 23.7	16.102
10	11 9 14.53	2.0908	7 49 10.6	16.154	10	12 47 6.57	2.0221	5 16 28.9	16.070
11	11 11 19.87	2.0872	7 33 0.4	16.185	11	12 49 7.92	2.0229	5 32 32.1	16.036
12	11 13 24.99	2.0837	7 16 48.4	16.213	12	12 51 9.32	2.0238	5 48 33.2	16.001
13	11 15 29.91	2.0803	7 0 34.8	16.241	13	12 53 10.77	2.0247	6 4 32.2	15.965
14	11 17 34.62	2.0769	6 44 19.5	16.267	14	12 55 12.28	2.0257	6 20 29.0	15.928
15	11 19 39.14	2.0737	6 28 2.7	16.292	15	12 57 13.85	2.0267	6 36 23.5	15.889
16	11 21 43.47	2.0706	6 11 44.5	16.315	16	12 59 15.48	2.0278	6 52 15.7	15.849
17	11 23 47.61	2.0675	5 55 24.9	16.337	17	13 1 17.19	2.0291	7 8 5.4	15.808
18	11 25 51.57	2.0646	5 39 4.1	16.357	18	13 3 18.97	2.0304	7 23 52.7	15.767
19	11 27 55.36	2.0617	5 22 42.1	16.376	19	13 5 20.84	2.0318	7 39 37.4	15.723
20	11 29 58.98	2.0589	5 6 19.0	16.393	20	13 7 22.79	2.0333	7 55 19.4	15.678
21	11 32 2.43	2.0562	4 49 54.9	16.410	21	13 9 24.83	2.0348	8 10 58.7	15.631
22	11 34 5.73	2.0537	4 33 29.8	16.425	22	13 11 26.97	2.0365	8 26 35.2	15.583
23	11 36 8.88	2.0512	N. 4 17 3.9	16.438	23	13 13 29.21	2.0382	S. 8 42 8.8	15.536
MONDAY 2.					WEDNESDAY 4.				
0	11 38 11.88	2.0488	N. 4 0 37.3	16.449	0	13 15 31.55	2.0399	S. 8 57 39.4	15.486
1	11 40 14.74	2.0466	3 44 10.0	16.459	1	13 17 34.00	2.0418	9 13 7.0	15.434
2	11 42 17.47	2.0443	3 27 42.1	16.469	2	13 19 36.57	2.0438	9 28 31.5	15.382
3	11 44 20.07	2.0422	3 11 13.7	16.477	3	13 21 39.25	2.0458	9 43 52.9	15.329
4	11 46 22.54	2.0402	2 54 44.8	16.484	4	13 23 42.06	2.0478	9 59 11.0	15.274
5	11 48 24.89	2.0383	2 38 15.6	16.489	5	13 25 44.99	2.0499	10 14 25.8	15.218
6	11 50 27.13	2.0365	2 21 46.1	16.493	6	13 27 48.05	2.0521	10 29 37.2	15.161
7	11 52 29.27	2.0348	2 5 16.5	16.495	7	13 29 51.24	2.0543	10 44 45.1	15.102
8	11 54 31.30	2.0331	1 48 46.7	16.497	8	13 31 54.57	2.0567	10 59 49.4	15.042
9	11 56 33.24	2.0316	1 32 16.9	16.497	9	13 33 58.05	2.0592	11 14 50.1	14.981
10	11 58 35.09	2.0301	1 15 47.1	16.496	10	13 36 1.67	2.0616	11 29 47.1	14.919
11	12 0 36.85	2.0287	0 59 17.4	16.493	11	13 38 5.44	2.0641	11 44 40.4	14.856
12	12 2 38.54	2.0275	0 42 48.0	16.488	12	13 40 9.36	2.0667	11 59 29.8	14.791
13	12 4 40.15	2.0263	0 26 18.9	16.483	13	13 42 13.44	2.0693	12 14 15.3	14.725
14	12 6 41.70	2.0252	N. 0 9 50.1	16.477	14	13 44 17.68	2.0721	12 28 56.8	14.658
15	12 8 43.18	2.0242	S. 0 6 38.3	16.468	15	13 46 22.09	2.0749	12 43 34.2	14.589
16	12 10 44.61	2.0233	0 23 6.1	16.458	16	13 48 26.67	2.0778	12 58 7.5	14.519
17	12 12 45.98	2.0225	0 39 33.3	16.448	17	13 50 31.42	2.0807	13 12 36.5	14.448
18	12 14 47.31	2.0218	0 55 59.8	16.436	18	13 52 36.35	2.0836	13 27 1.3	14.377
19	12 16 48.59	2.0211	1 12 25.6	16.423	19	13 54 41.45	2.0866	13 41 21.7	14.303
20	12 18 49.84	2.0206	1 28 50.5	16.408	20	13 56 46.74	2.0897	13 55 37.7	14.228
21	12 20 51.06	2.0202	1 45 14.5	16.393	21	13 58 52.22	2.0928	14 9 49.1	14.152
22	12 22 52.26	2.0198	2 1 37.6	16.376	22	14 0 57.88	2.0960	14 23 55.9	14.075
23	12 24 53.43	2.0194	2 17 59.6	16.357	23	14 3 3.74	2.0992	14 37 58.1	13.997
24	12 26 54.59	2.0192	S. 2 34 20.4	16.337	24	14 5 9.79	2.1025	S. 14 51 55.6	13.918

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	THURSDAY 5.					SATURDAY 7.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	14 5 9.79	2.1025	S.14 51 55.6	13.918	0	15 50 25.40	2.2860	S.24 5 38.1	8.718
1	14 7 16.04	2.1058	15 5 48.2	13.837	1	15 52 42.67	2.2896	24 14 17.2	8.584
2	14 9 22.49	2.1092	15 19 36.0	13.755	2	15 55 0.15	2.2931	24 22 48.2	8.449
3	14 11 29.15	2.1127	15 33 18.8	13.672	3	15 57 17.84	2.2966	24 31 11.1	8.313
4	14 13 36.01	2.1161	15 46 56.6	13.588	4	15 59 35.74	2.3000	24 39 25.8	8.176
5	14 15 43.08	2.1196	16 0 29.3	13.502	5	16 1 53.84	2.3034	24 47 32.2	8.038
6	14 17 50.36	2.1232	16 13 56.8	13.414	6	16 4 12.15	2.3067	24 55 30.3	7.899
7	14 19 57.86	2.1268	16 27 19.0	13.326	7	16 6 30.65	2.3099	25 3 20.1	7.760
8	14 22 5.58	2.1304	16 40 35.9	13.237	8	16 8 49.34	2.3132	25 11 1.5	7.619
9	14 24 13.51	2.1340	16 53 47.4	13.147	9	16 11 8.23	2.3163	25 18 34.4	7.478
10	14 26 21.66	2.1377	17 6 53.5	13.055	10	16 13 27.30	2.3194	25 25 58.9	7.337
11	14 28 30.03	2.1414	17 19 54.0	12.962	11	16 15 46.56	2.3224	25 33 14.8	7.193
12	14 30 38.63	2.1452	17 32 48.9	12.868	12	16 18 5.99	2.3253	25 40 22.1	7.050
13	14 32 47.46	2.1490	17 45 38.1	12.773	13	16 20 25.60	2.3282	25 47 20.8	6.907
14	14 34 56.51	2.1528	17 58 21.6	12.676	14	16 22 45.38	2.3310	25 54 10.9	6.762
15	14 37 5.79	2.1567	18 10 59.3	12.578	15	16 25 5.32	2.3337	26 0 52.2	6.616
16	14 39 15.31	2.1606	18 23 31.0	12.479	16	16 27 25.43	2.3364	26 7 24.8	6.470
17	14 41 25.06	2.1644	18 35 56.7	12.378	17	16 29 45.69	2.3389	26 13 48.6	6.323
18	14 43 35.04	2.1683	18 48 16.4	12.277	18	16 32 6.10	2.3414	26 20 3.6	6.176
19	14 45 45.26	2.1723	19 0 30.0	12.175	19	16 34 26.66	2.3439	26 26 9.7	6.028
20	14 47 55.72	2.1762	19 12 37.4	12.072	20	16 36 47.37	2.3462	26 32 6.9	5.879
21	14 50 6.41	2.1802	19 24 38.6	11.967	21	16 39 8.21	2.3484	26 37 55.2	5.730
22	14 52 17.34	2.1842	19 36 33.4	11.861	22	16 41 29.18	2.3506	26 43 34.5	5.581
23	14 54 28.51	2.1882	S.19 48 21.9	11.754	23	16 43 50.28	2.3527	S.26 49 4.9	3.431
	FRIDAY 6.					SUNDAY 8.			
0	14 56 39.92	2.1922	S.20 0 3.9	11.645	0	16 46 11.50	2.3547	S.26 54 26.2	5.280
1	14 58 51.57	2.1962	20 11 39.3	11.535	1	16 48 32.84	2.3566	26 59 38.5	5.129
2	15 1 3.46	2.2002	20 23 8.1	11.425	2	16 50 54.29	2.3583	27 4 41.7	4.978
3	15 3 15.59	2.2043	20 34 30.3	11.313	3	16 53 15.84	2.3600	27 9 35.8	4.826
4	15 5 27.96	2.2083	20 45 45.7	11.200	4	16 55 37.49	2.3616	27 14 20.8	4.674
5	15 7 40.58	2.2123	20 56 54.3	11.086	5	16 57 59.23	2.3631	27 18 56.7	4.521
6	15 9 53.44	2.2163	21 7 56.0	10.971	6	17 0 21.06	2.3645	27 23 23.3	4.368
7	15 12 6.54	2.2204	21 18 50.8	10.854	7	17 2 42.97	2.3658	27 27 40.8	4.215
8	15 14 19.89	2.2244	21 29 38.5	10.737	8	17 5 4.96	2.3670	27 31 49.1	4.062
9	15 16 33.47	2.2283	21 40 19.2	10.619	9	17 7 27.01	2.3681	27 35 48.2	3.908
10	15 18 47.29	2.2323	21 50 52.8	10.499	10	17 9 49.13	2.3692	27 39 38.0	3.753
11	15 21 1.35	2.2363	22 1 19.1	10.378	11	17 12 11.31	2.3700	27 43 18.5	3.598
12	15 23 15.65	2.2403	22 11 38.2	10.257	12	17 14 33.53	2.3707	27 46 49.8	3.444
13	15 25 30.19	2.2443	22 21 50.0	10.135	13	17 16 55.80	2.3714	27 50 11.8	3.289
14	15 27 44.97	2.2482	22 31 54.4	10.011	14	17 19 18.10	2.3719	27 53 24.5	3.134
15	15 29 59.98	2.2521	22 41 51.3	9.886	15	17 21 40.43	2.3723	27 56 27.9	2.979
16	15 32 15.22	2.2560	22 51 40.7	9.760	16	17 24 2.78	2.3727	27 59 22.0	2.823
17	15 34 30.70	2.2599	23 1 22.5	9.633	17	17 26 25.16	2.3730	28 2 6.7	2.667
18	15 36 46.41	2.2637	23 10 56.7	9.506	18	17 28 47.54	2.3731	28 4 42.1	2.512
19	15 39 2.35	2.2675	23 20 23.2	9.377	19	17 31 9.93	2.3731	28 7 8.2	2.357
20	15 41 18.51	2.2713	23 29 41.9	9.247	20	17 33 32.31	2.3730	28 9 25.0	2.202
21	15 43 34.90	2.2750	23 38 52.8	9.117	21	17 35 54.69	2.3728	28 11 32.5	2.047
22	15 45 51.51	2.2787	23 47 55.9	8.985	22	17 38 17.05	2.3724	28 13 30.7	1.892
23	15 48 8.35	2.2824	23 56 51.0	8.852	23	17 40 39.38	2.3720	28 15 19.5	1.736
24	15 50 25.40	2.2860	S.24 5 38.1	8.718	24	17 43 1.69	2.3715	S.28 16 59.0	1.581

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	MONDAY 9.					WEDNESDAY 11.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	17 43 1.69	2.3715	S.28 16 59.0	1.581	0	19 34 12.52	2.2261	S.26 40 50.2	5.357
1	17 45 23.96	2.3708	28 18 29.2	1.425	1	19 36 25.94	2.2212	26 35 25.0	5.483
2	17 47 46.19	2.3700	28 19 50.0	1.270	2	19 38 39.06	2.2162	26 29 52.2	5.609
3	17 50 8.37	2.3691	28 21 1.6	1.116	3	19 40 51.88	2.2112	26 24 11.9	5.733
4	17 52 30.49	2.3682	28 22 3.9	0.961	4	19 43 4.40	2.2062	26 18 24.2	5.857
5	17 54 52.54	2.3670	28 22 56.9	0.807	5	19 45 16.62	2.2011	26 12 29.0	5.981
6	17 57 14.52	2.3658	28 23 40.7	0.653	6	19 47 28.53	2.1959	26 6 26.5	6.102
7	17 59 36.43	2.3644	28 24 15.2	0.498	7	19 49 40.13	2.1908	26 0 16.8	6.223
8	18 1 58.25	2.3629	28 24 40.4	0.344	8	19 51 51.42	2.1856	25 53 59.8	6.343
9	18 4 19.98	2.3614	28 24 56.4	0.191	9	19 54 2.40	2.1803	25 47 35.6	6.462
10	18 6 41.62	2.3597	28 25 3.3	−0.038	10	19 56 13.06	2.1751	25 41 4.3	6.580
11	18 9 3.15	2.3579	28 25 1.0	+0.115	11	19 58 23.41	2.1698	25 34 26.0	6.697
12	18 11 24.57	2.3560	28 24 49.5	0.268	12	20 0 33.44	2.1645	25 27 40.7	6.813
13	18 13 45.87	2.3540	28 24 28.9	0.420	13	20 2 43.15	2.1592	25 20 48.4	6.928
14	18 16 7.05	2.3519	28 23 59.1	0.572	14	20 4 52.55	2.1539	25 13 49.3	7.042
15	18 18 28.10	2.3497	28 23 20.3	0.723	15	20 7 1.62	2.1485	25 6 43.4	7.155
16	18 20 49.02	2.3474	28 22 32.4	0.874	16	20 9 10.37	2.1431	24 59 30.7	7.267
17	18 23 9.79	2.3449	28 21 35.4	1.024	17	20 11 18.79	2.1377	24 52 11.3	7.378
18	18 25 30.41	2.3423	28 20 29.5	1.173	18	20 13 26.89	2.1323	24 44 45.3	7.488
19	18 27 50.87	2.3397	28 19 14.6	1.323	19	20 15 34.67	2.1270	24 37 12.7	7.598
20	18 30 11.18	2.3371	28 17 50.8	1.472	20	20 17 42.13	2.1216	24 29 33.6	7.706
21	18 32 31.32	2.3342	28 16 18.0	1.620	21	20 19 49.26	2.1161	24 21 48.0	7.812
22	18 34 51.28	2.3313	28 14 36.4	1.768	22	20 21 56.06	2.1106	24 13 56.1	7.918
23	18 37 11.07	2.3283	S.28 12 45.9	1.915	23	20 24 2.53	2.1052	S.24 5 57.8	8.024
	TUESDAY 10.					THURSDAY 12.			
0	18 39 30.67	2.3251	S.28 10 46.6	2.062	0	20 26 8.68	2.0998	S.23 57 53.2	8.128
1	18 41 50.08	2.3219	28 8 38.5	2.208	1	20 28 14.50	2.0943	23 49 42.4	8.231
2	18 44 9.30	2.3186	28 6 21.7	2.353	2	20 30 20.00	2.0889	23 41 25.5	8.333
3	18 46 28.31	2.3151	28 3 56.2	2.497	3	20 32 25.17	2.0835	23 33 2.5	8.433
4	18 48 47.11	2.3117	28 1 22.1	2.641	4	20 34 30.02	2.0781	23 24 33.5	8.533
5	18 51 5.71	2.3082	27 58 39.3	2.784	5	20 36 34.54	2.0727	23 15 58.5	8.633
6	18 53 24.09	2.3044	27 55 48.0	2.927	6	20 38 38.74	2.0673	23 7 17.5	8.732
7	18 55 42.24	2.3007	27 52 48.1	3.069	7	20 40 42.61	2.0618	22 58 30.7	8.828
8	18 58 0.17	2.2969	27 49 39.7	3.210	8	20 42 46.16	2.0565	22 49 38.2	8.923
9	19 0 17.87	2.2930	27 46 22.9	3.350	9	20 44 49.39	2.0512	22 40 39.9	9.018
10	19 2 35.33	2.2890	27 42 57.7	3.490	10	20 46 52.30	2.0458	22 31 36.0	9.112
11	19 4 52.55	2.2849	27 39 24.1	3.629	11	20 48 54.89	2.0405	22 22 26.4	9.206
12	19 7 9.52	2.2808	27 35 42.2	3.767	12	20 50 57.16	2.0351	22 13 11.3	9.298
13	19 9 26.24	2.2766	27 31 52.1	3.903	13	20 52 59.11	2.0299	22 3 50.7	9.389
14	19 11 42.71	2.2723	27 27 53.8	4.040	14	20 55 0.75	2.0247	21 54 24.6	9.479
15	19 13 58.92	2.2679	27 23 47.3	4.176	15	20 57 2.07	2.0194	21 44 53.2	9.568
16	19 16 14.86	2.2635	27 19 32.7	4.311	16	20 59 3.08	2.0143	21 35 16.4	9.657
17	19 18 30.54	2.2591	27 15 10.0	4.445	17	21 1 3.78	2.0091	21 25 34.4	9.743
18	19 20 45.95	2.2545	27 10 39.3	4.577	18	21 3 4.17	2.0039	21 15 47.2	9.830
19	19 23 1.08	2.2499	27 6 0.7	4.709	19	21 5 4.25	1.9988	21 5 54.8	9.916
20	19 25 15.94	2.2452	27 1 14.2	4.841	20	21 7 4.03	1.9937	20 55 57.3	10.000
21	19 27 30.51	2.2405	26 56 19.8	4.971	21	21 9 3.50	1.9887	20 45 54.8	10.083
22	19 29 44.80	2.2358	26 51 17.7	5.100	22	21 11 2.67	1.9837	20 35 47.3	10.166
23	19 31 58.81	2.2310	26 46 7.8	5.229	23	21 13 1.54	1.9787	20 25 34.9	10.247
24	19 34 12.52	2.2261	S.26 40 50.2	5.357	24	21 15 0.11	1.9737	S.20 15 17.6	10.328

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	FRIDAY 13.					SUNDAY 15.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	21 15 0.11	1.9737	S. 20 15 17.6	10.328	0	22 44 58.26	1.7976	S. 10 42 54.1	13.218
1	21 16 58.39	1.9688	20 4 55.5	10.408	1	22 46 46.05	1.7954	10 29 39.8	13.260
2	21 18 56.37	1.9639	19 54 28.7	10.487	2	22 48 33.71	1.7933	10 16 23.0	13.301
3	21 20 54.06	1.9591	19 43 57.1	10.565	3	22 50 21.25	1.7914	10 3 3.7	13.341
4	21 22 51.46	1.9543	19 33 20.9	10 642	4	22 52 8.68	1.7896	9 49 42.0	13.382
5	21 24 48.57	1.9495	19 22 40.1	10.717	5	22 53 56.00	1.7877	9 36 17.9	13.421
6	21 26 45.40	1.9448	19 11 54.8	10.792	6	22 55 43.21	1.7859	9 22 51.5	13.459
7	21 28 41.95	1.9402	19 1 5.0	10.867	7	22 57 30.31	1.7842	9 9 22.8	13.497
8	21 30 38.22	1.9356	18 50 10.7	10.941	8	22 59 17.32	1.7827	8 55 51.9	13.534
9	21 32 34.22	1.9310	18 39 12.1	11.013	9	23 1 4.24	1.7812	8 42 18.7	13.571
10	21 34 29.94	1.9264	18 28 9.1	11.085	10	23 2 51.06	1.7797	8 28 43.4	13.607
11	21 36 25.39	1.9220	18 17 1.9	11.156	11	23 4 37.80	1.7783	8 15 5.9	13.642
12	21 38 20.58	1.9177	18 5 50.4	11.226	12	23 6 24.46	1.7770	8 1 26.4	13.676
13	21 40 15.51	1.9132	17 54 34.8	11.295	13	23 8 11.04	1.7758	7 47 44.8	13.710
14	21 42 10.17	1.9088	17 43 15.0	11.363	14	23 9 57.56	1.7747	7 34 1.2	13.743
15	21 44 4.57	1.9046	17 31 51.2	11.431	15	23 11 44.01	1.7736	7 20 15.6	13.776
16	21 45 58.72	1.9004	17 20 23.3	11.498	16	23 13 30.39	1.7726	7 6 28.1	13.808
17	21 47 52.62	1.8963	17 8 51.5	11.563	17	23 15 16.72	1.7717	6 52 38.6	13.840
18	21 49 46.27	1.8922	16 57 15.8	11.628	18	23 17 2.99	1.7708	6 38 47.3	13.870
19	21 51 39.68	1.8881	16 45 36.2	11.692	19	23 18 49.21	1.7700	6 24 54.2	13.900
20	21 53 32.84	1.8841	16 33 52.7	11.756	20	23 20 35.39	1.7693	6 10 59.3	13.929
21	21 55 25.77	1.8802	16 22 5.5	11.818	21	23 22 21.53	1.7687	5 57 2.7	13.958
22	21 57 18.47	1.8763	16 10 14.5	11.880	22	23 24 7.64	1.7682	5 43 4.3	13.987
23	21 59 10.93	1.8724	S. 15 58 19.9	11.940	23	23 25 53.72	1.7677	S. 5 29 4.3	14.014
	SATURDAY 14.					MONDAY 16.			
0	22 1 3.16	1.8687	S. 15 46 21.7	12.000	0	23 27 39.77	1.7673	S. 5 15 2.6	14.042
1	22 2 55.17	1.8650	15 34 19.9	12.060	1	23 29 25.80	1.7671	5 0 59.3	14.068
2	22 4 46.96	1.8613	15 22 14.5	12.118	2	23 31 11.82	1.7668	4 46 54.5	14.093
3	22 6 38.53	1.8577	15 10 5.7	12.176	3	23 32 57.82	1.7667	4 32 48.2	14.118
4	22 8 29.89	1.8542	14 57 53.4	12.233	4	23 34 43.82	1.7667	4 18 40.4	14.142
5	22 10 21.04	1.8508	14 45 37.7	12.289	5	23 36 29.82	1.7667	4 4 31.2	14.165
6	22 12 11.99	1.8474	14 33 18.7	12.345	6	23 38 15.82	1.7668	3 50 20.6	14.188
7	22 14 2.73	1.8440	14 20 56.3	12.400	7	23 40 1.83	1.7670	3 36 8.6	14.212
8	22 15 53.27	1.8408	14 8 30.7	12.453	8	23 41 47.86	1.7673	3 21 55.2	14.233
9	22 17 43.62	1.8376	13 56 1.9	12.506	9	23 43 33.90	1.7676	3 7 40.6	14.253
10	22 19 33.78	1.8344	13 43 30.0	12.558	10	23 45 19.97	1.7680	2 53 24.8	14.273
11	22 21 23.75	1.8313	13 30 54.9	12.611	11	23 47 6.06	1.7685	2 39 7.8	14.293
12	22 23 13.54	1.8283	13 18 16.7	12.662	12	23 48 52.19	1.7691	2 24 49.6	14.313
13	22 25 3.15	1.8254	13 5 35.5	12.712	13	23 50 38.35	1.7698	2 10 30.3	14.331
14	22 26 52.59	1.8226	12 52 51.3	12.761	14	23 52 24.56	1.7705	1 56 9.9	14.348
15	22 28 41.86	1.8197	12 40 4.2	12.810	15	23 54 10.81	1.7713	1 41 48.5	14.366
16	22 30 30.96	1.8169	12 27 14.1	12.858	16	23 55 57.12	1.7723	1 27 26.0	14.383
17	22 32 19.89	1.8142	12 14 21.2	12.906	17	23 57 43.49	1.7733	1 13 2.6	14.398
18	22 34 8.67	1.8117	12 1 25.4	12.953	18	23 59 29.92	1.7743	0 58 38.3	14.413
19	22 35 57.30	1.8092	11 48 26.9	12.998	19	0 1 16.41	1.7755	0 44 13.1	14.428
20	22 37 45.77	1.8067	11 35 25.7	13.043	20	0 3 2.98	1.7768	0 29 47.0	14.441
21	22 39 34.10	1.8043	11 22 21.7	13.088	21	0 4 49.62	1.7781	0 15 20.2	14.454
22	22 41 22.29	1.8020	11 9 15.1	13.132	22	0 6 36.35	1.7796	S. 0 0 52.6	14.466
23	22 43 10.34	1.7998	10 56 5.9	13.175	23	0 8 23.17	1.7811	N. 0 13 35.7	14.478
24	22 44 58.26	1.7976	S. 10 42 54.1	13.218	24	0 10 10.08	1.7827	N. 0 28 4.7	14.488

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	TUESDAY 17.					THURSDAY 19.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	0 10 10.08	1.7827	N. 0 28 4.7	14.488	0	1 39 14.07	1.9629	N. 12 0 55.6	14.030
1	0 11 57.09	1.7843	0 42 34.3	14.498	1	1 41 12.02	1.9688	12 14 56.4	13.996
2	0 13 44.20	1.7861	0 57 4.5	14.508	2	1 43 10.33	1.9749	12 28 55.1	13.960
3	0 15 31.42	1.7879	1 11 35.3	14.517	3	1 45 9.01	1.9811	12 42 51.6	13.923
4	0 17 18.75	1.7898	1 26 6.6	14.525	4	1 47 8.06	1.9873	12 56 45.9	13.885
5	0 19 6.20	1.7918	1 40 38.3	14.532	5	1 49 7.49	1.9937	13 10 37.8	13.846
6	0 20 53.77	1.7939	1 55 10.4	14.538	6	1 51 7.30	2.0000	13 24 27.4	13.806
7	0 22 41.47	1.7962	2 9 42.9	14.544	7	1 53 7.49	2.0065	13 38 14.5	13.763
8	0 24 29.31	1.7984	2 24 15.7	14.549	8	1 55 8.08	2.0132	13 51 59.0	13.720
9	0 26 17.28	1.8008	2 38 48.8	14.553	9	1 57 9.07	2.0198	14 5 40.9	13.676
10	0 28 5.40	1.8033	2 53 22.1	14.557	10	1 59 10.46	2.0265	14 19 20.1	13.630
11	0 29 53.67	1.8058	3 7 55.6	14.560	11	2 1 12.25	2.0333	14 32 56.5	13.582
12	0 31 42.10	1.8085	3 22 29.3	14.562	12	2 3 14.46	2.0403	14 46 30.0	13.533
13	0 33 30.69	1.8112	3 37 3.0	14.563	13	2 5 17.08	2.0473	15 0 0.5	13.483
14	0 35 19.44	1.8139	3 51 36.8	14.563	14	2 7 20.13	2.0544	15 13 28.0	13.432
15	0 37 8.36	1.8168	4 6 10.6	14.563	15	2 9 23.61	2.0616	15 26 52.4	13.379
16	0 38 57.46	1.8198	4 20 44.4	14.562	16	2 11 27.52	2.0688	15 40 13.5	13.324
17	0 40 46.74	1.8229	4 35 18.1	14.560	17	2 13 31.86	2.0761	15 53 31.3	13.268
18	0 42 36.21	1.8261	4 49 51.6	14.557	18	2 15 36.65	2.0836	16 6 45.7	13.211
19	0 44 25.87	1.8293	5 4 24.9	14.553	19	2 17 41.89	2.0911	16 19 56.6	13.152
20	0 46 15.73	1.8327	5 18 57.9	14.548	20	2 19 47.58	2.0986	16 33 3.9	13.091
21	0 48 5.79	1.8361	5 33 30.7	14.543	21	2 21 53.72	2.1062	16 46 7.5	13.029
22	0 49 56.06	1.8396	5 48 3.1	14.537	22	2 24 0.32	2.1139	16 59 7.4	12.966
23	0 51 46.54	1.8433	N. 6 2 35.1	14.529	23	2 26 7.39	2.1217	N. 17 12 3.4	12.901
	WEDNESDAY 18.					FRIDAY 20.			
0	0 53 37.25	1.8470	N. 6 17 6.6	14.521	0	2 28 14.93	2.1296	N. 17 24 55.5	12.834
1	0 55 28.18	1.8508	6 31 37.6	14.512	1	2 30 22.94	2.1375	17 37 43.5	12.765
2	0 57 19.34	1.8546	6 46 8.1	14.502	2	2 32 31.43	2.1455	17 50 27.3	12.695
3	0 59 10.73	1.8585	7 0 37.9	14.491	3	2 34 40.40	2.1536	18 3 6.9	12.624
4	1 1 2.36	1.8626	7 15 7.0	14.479	4	2 36 49.86	2.1617	18 15 42.2	12.551
5	1 2 54.24	1.8668	7 29 35.4	14.467	5	2 38 59.81	2.1699	18 28 13.0	12.475
6	1 4 46.38	1.8711	7 44 3.0	14.454	6	2 41 10.25	2.1782	18 40 39.2	12.398
7	1 6 38.77	1.8754	7 58 29.8	14.439	7	2 43 21.19	2.1865	18 53 0.8	12.320
8	1 8 31.43	1.8798	8 12 55.7	14.423	8	2 45 32.63	2.1948	19 5 17.6	12.240
9	1 10 24.35	1.8843	8 27 20.6	14.407	9	2 47 44.57	2.2033	19 17 29.6	12.158
10	1 12 17.54	1.8889	8 41 44.5	14.389	10	2 49 57.02	2.2118	19 29 36.6	12.074
11	1 14 11.02	1.8937	8 56 7.3	14.370	11	2 52 9.99	2.2205	19 41 38.5	11.989
12	1 16 4.78	1.8984	9 10 28.9	14.350	12	2 54 23.47	2.2291	19 53 35.3	11.902
13	1 17 58.83	1.9032	9 24 49.3	14.330	13	2 56 37.47	2.2377	20 5 26.8	11.813
14	1 19 53.17	1.9082	9 39 8.5	14.308	14	2 58 51.99	2.2463	20 17 12.8	11.722
15	1 21 47.82	1.9133	9 53 26.3	14.285	15	3 1 7.03	2.2551	20 28 53.4	11.629
16	1 23 42.77	1.9185	10 7 42.7	14.261	16	3 3 22.60	2.2639	20 40 28.3	11.534
17	1 25 38.04	1.9237	10 21 57.6	14.237	17	3 5 38.70	2.2728	20 51 57.5	11.437
18	1 27 33.62	1.9290	10 36 11.1	14.211	18	3 7 55.33	2.2817	21 3 20.8	11.339
19	1 29 29.52	1.9344	10 50 22.9	14.183	19	3 10 12.50	2.2906	21 14 38.2	11.239
20	1 31 25.75	1.9400	11 4 33.0	14.154	20	3 12 30.20	2.2994	21 25 49.5	11.138
21	1 33 22.32	1.9456	11 18 41.4	14.125	21	3 14 48.43	2.3084	21 36 54.7	11.034
22	1 35 19.22	1.9513	11 32 48.0	14.095	22	3 17 7.21	2.3175	21 47 53.6	10.927
23	1 37 16.47	1.9571	11 46 52.8	14.063	23	3 19 26.53	2.3265	21 58 46.0	10.819
24	1 39 14.07	1.9629	N. 12 0 55.6	14.030	24	3 21 46.39	2.3355	N. 22 9 31.9	10.710

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	SATURDAY 21.					MONDAY 23.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	3 21 46.39	2.3355	N.22 9 31.9	10.710	0	5 23 46.89	2.7174	N.27 59 46.0	3.169
1	3 24 6.79	2.3445	22 20 11.2	10.598	1	5 26 30.09	2.7225	28 2 50.2	2.970
2	3 26 27.73	2.3536	22 30 43.7	10.484	2	5 29 13.59	2.7273	28 5 42.5	2.771
3	3 28 49.22	2.3627	22 41 9.3	10.368	3	5 31 57.37	2.7320	28 8 22.7	2.570
4	3 31 11.26	2.3718	22 51 27.9	10.251	4	5 34 41.43	2.7365	28 10 50.9	2.368
5	3 33 33.84	2.3809	23 1 39.4	10.132	5	5 37 25.75	2.7408	28 13 6.9	2.165
6	3 35 56.97	2.3900	23 11 43.7	10.010	6	5 40 10.33	2.7449	28 15 10.7	1.961
7	3 38 20.64	2.3991	23 21 40.6	9.886	7	5 42 55.14	2.7487	28 17 2.2	1.756
8	3 40 44.86	2.4082	23 31 30.0	9.760	8	5 45 40.17	2.7523	28 18 41.4	1.551
9	3 43 9.62	2.4173	23 41 11.8	9.632	9	5 48 25.42	2.7558	28 20 8.3	1.344
10	3 45 34.93	2.4263	23 50 45.9	9.503	10	5 51 10.87	2.7591	28 21 22.7	1.137
11	3 48 0.78	2.4353	24 0 12.1	9.371	11	5 53 56.51	2.7622	28 22 24.7	0.928
12	3 50 27.17	2.4443	24 9 30.4	9.238	12	5 56 42.33	2.7650	28 23 14.1	0.719
13	3 52 54.10	2.4533	24 18 40.6	9.103	13	5 59 28.31	2.7676	28 23 51.0	0.510
14	3 55 21.57	2.4623	24 27 42.7	8.965	14	6 2 14.44	2.7700	28 24 15.3	0.299
15	3 57 49.58	2.4713	24 36 36.4	8.824	15	6 5 0.71	2.7722	28 24 26.9	+0.088
16	4 0 18.13	2.4802	24 45 21.6	8.683	16	6 7 47.10	2.7740	28 24 25.9	−0.123
17	4 2 47.21	2.4891	24 53 58.3	8.539	17	6 10 33.59	2.7757	28 24 12.2	0.334
18	4 5 16.82	2.4978	25 2 26.3	8.393	18	6 13 20.18	2.7772	28 23 45.8	0.546
19	4 7 46.95	2.5066	25 10 45.5	8.246	19	6 16 6.85	2.7783	28 23 6.7	0.758
20	4 10 17.61	2.5153	25 18 55.8	8.097	20	6 18 53.58	2.7793	28 22 14.9	0.970
21	4 12 48.79	2.5239	25 26 57.1	7.945	21	6 21 40.37	2.7802	28 21 10.3	1.182
22	4 15 20.48	2.5325	25 34 49.2	7.791	22	6 24 27.21	2.7808	28 19 53.0	1.395
23	4 17 52.69	2.5411	N.25 42 32.0	7.635	23	6 27 14.07	2.7811	N.28 18 22.9	1.608
	SUNDAY 22.					TUESDAY 24.			
0	4 20 25.41	2.5495	N.25 50 5.4	7.477	0	6 30 0.94	2.7812	N.28 16 40.0	1.821
1	4 22 58.63	2.5578	25 57 29.3	7.318	1	6 32 47.82	2.7812	28 14 44.4	2.033
2	4 25 32.35	2.5661	26 4 43.6	7.157	2	6 35 34.68	2.7808	28 12 36.0	2.247
3	4 28 6.56	2.5743	26 11 48.2	6.994	3	6 38 21.51	2.7802	28 10 14.8	2.459
4	4 30 41.26	2.5823	26 18 42.9	6.829	4	6 41 8.30	2.7794	28 7 40.9	2.671
5	4 33 16.44	2.5903	26 25 27.7	6.662	5	6 43 55.04	2.7784	28 4 54.3	2.883
6	4 35 52.10	2.5982	26 32 2.4	6.493	6	6 46 41.71	2.7772	28 1 55.0	3.094
7	4 38 28.23	2.6060	26 38 26.8	6.322	7	6 49 28.30	2.7757	27 58 43.0	3.305
8	4 41 4.82	2.6137	26 44 41.0	6.150	8	6 52 14.79	2.7739	27 55 18.4	3.515
9	4 43 41.87	2.6213	26 50 44.8	5.976	9	6 55 1.17	2.7721	27 51 41.2	3.726
10	4 46 19.37	2.6287	26 56 38.1	5.800	10	6 57 47.44	2.7701	27 47 51.3	3.936
11	4 48 57.31	2.6360	27 2 20.8	5.622	11	7 0 33.58	2.7678	27 43 48.9	4.144
12	4 51 35.69	2.6432	27 7 52.8	5.443	12	7 3 19.57	2.7652	27 39 34.0	4.353
13	4 54 14.49	2.6502	27 13 14.0	5.262	13	7 6 5.40	2.7624	27 35 6.6	4.561
14	4 56 53.71	2.6571	27 18 24.3	5.079	14	7 8 51.06	2.7594	27 30 26.7	4.768
15	4 59 33.34	2.6639	27 23 23.5	4.895	15	7 11 36.53	2.7562	27 25 34.5	4.973
16	5 2 13.38	2.6705	27 28 11.6	4.708	16	7 14 21.81	2.7529	27 20 30.0	5.178
17	5 4 53.80	2.6768	27 32 48.5	4.521	17	7 17 6.88	2.7494	27 15 13.2	5.382
18	5 7 34.60	2.6831	27 37 14.1	4.332	18	7 19 51.74	2.7457	27 9 44.2	5.584
19	5 10 15.77	2.6893	27 41 28.4	4.142	19	7 22 36.37	2.7418	27 4 3.1	5.786
20	5 12 57.31	2.6953	27 45 31.2	3.950	20	7 25 20.76	2.7377	26 58 9.9	5.987
21	5 15 39.20	2.7011	27 49 22.4	3.757	21	7 28 4.89	2.7334	26 52 4.6	6.187
22	5 18 21.44	2.7067	27 53 2.0	3.563	22	7 30 48.77	2.7291	26 45 47.4	6.385
23	5 21 4.00	2.7121	27 56 29.9	3.367	23	7 33 32.38	2.7244	26 39 18.4	6.582
24	5 23 46.89	2.7174	N.27 59 46.0	3.169	24	7 36 15.70	2.7196	N.26 32 37.5	6.778

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	WEDNESDAY 25.					FRIDAY 27.			
	h m s	s	° ′ ″	″		h m s	s	° ′ ″	″
0	7 36 15.70	2.7196	N.26 32 37.5	6.778	0	9 39 11.10	2.3816	N.17 54 25.5	14.049
1	7 38 58.73	2.7146	26 25 45.0	6.972	1	9 41 33.77	2.3741	17 40 19.5	14.149
2	7 41 41.45	2.7094	26 18 40.8	7.166	2	9 43 55.99	2.3666	17 26 7.6	14.247
3	7 44 23.86	2.7042	26 11 25.1	7.357	3	9 46 17.76	2.3592	17 11 49.8	14.344
4	7 47 5.95	2.6988	26 3 57.9	7.547	4	9 48 39.09	2.3518	16 57 26.3	14.438
5	7 49 47.71	2.6932	25 56 19.4	7.736	5	9 50 59.97	2.3444	16 42 57.2	14.530
6	7 52 29.13	2.6875	25 48 29.6	7.923	6	9 53 20.42	2.3372	16 28 22.7	14.620
7	7 55 10.21	2.6817	25 40 28.6	8.109	7	9 55 40.44	2.3300	16 13 42.8	14.708
8	7 57 50.94	2.6757	25 32 16.5	8.293	8	9 58 0.02	2.3228	15 58 57.7	14.794
9	8 0 31.30	2.6696	25 23 53.5	8.475	9	10 0 19.17	2.3157	15 44 7.5	14.878
10	8 3 11.29	2.6633	25 15 19.5	8.656	10	10 2 37.90	2.3087	15 29 12.3	14.960
11	8 5 50.90	2.6570	25 6 34.8	8.834	11	10 4 56.21	2.3017	15 14 12.3	15.039
12	8 8 30.13	2.6505	24 57 39.4	9.012	12	10 7 14.10	2.2948	14 59 7.6	15.117
13	8 11 8.96	2.6439	24 48 33.4	9.187	13	10 9 31.58	2.2879	14 43 58.3	15.193
14	8 13 47.40	2.6373	24 39 17.0	9.360	14	10 11 48.65	2.2811	14 28 44.5	15.267
15	8 16 25.44	2.6306	24 29 50.2	9.532	15	10 14 5.31	2.2743	14 13 26.3	15.338
16	8 19 3.07	2.6237	24 20 13.1	9.702	16	10 16 21.57	2.2677	13 58 3.9	15.407
17	8 21 40.28	2.6167	24 10 25.9	9.869	17	10 18 37.44	2.2612	13 42 37.4	15.475
18	8 24 17.07	2.6097	24 0 28.8	10.035	18	10 20 52.91	2.2547	13 27 6.9	15.541
19	8 26 53.44	2.6026	23 50 21.7	10.200	19	10 23 8.00	2.2483	13 11 32.5	15.604
20	8 29 29.38	2.5953	23 40 4.8	10.362	20	10 25 22.70	2.2419	12 55 54.4	15.666
21	8 32 4.88	2.5881	23 29 38.3	10.522	21	10 27 37.03	2.2357	12 40 12.6	15.726
22	8 34 39.95	2.5807	23 19 2.2	10.680	22	10 29 50.98	2.2294	12 24 27.3	15.783
23	8 37 14.57	2.5733	N.23 8 16.7	10.836	23	10 32 4.56	2.2233	N.12 8 38.6	15.840
	THURSDAY 26.					SATURDAY 28.			
0	8 39 48.75	2.5659	N.22 57 21.9	10.990	0	10 34 17.78	2.2173	N.11 52 46.5	15.894
1	8 42 22.48	2.5584	22 46 17.9	11.142	1	10 36 30.64	2.2114	11 36 51.3	15.946
2	8 44 55.76	2.5509	22 35 4.9	11.291	2	10 38 43.15	2.2056	11 20 53.0	15.997
3	8 47 28.59	2.5433	22 23 43.0	11.439	3	10 40 55.31	2.1998	11 4 51.7	16.045
4	8 50 0.96	2.5357	22 12 12.2	11.585	4	10 43 7.13	2.1942	10 48 47.6	16.091
5	8 52 32.87	2.5280	22 0 32.8	11.728	5	10 45 18.61	2.1885	10 32 40.8	16.136
6	8 55 4.32	2.5203	21 48 44.8	11.870	6	10 47 29.75	2.1830	10 16 31.3	16.180
7	8 57 35.31	2.5127	21 36 48.4	12.009	7	10 49 40.57	2.1777	10 0 19.2	16.222
8	9 0 5.84	2.5049	21 24 43.7	12.147	8	10 51 51.07	2.1723	9 44 4.7	16.260
9	9 2 35.90	2.4972	21 12 30.8	12.282	9	10 54 1.25	2.1671	9 27 48.0	16.298
10	9 5 5.50	2.4894	21 0 9.9	12.414	10	10 56 11.12	2.1619	9 11 29.0	16.335
11	9 7 34.63	2.4817	20 47 41.1	12.545	11	10 58 20.68	2.1569	8 55 7.8	16.369
12	9 10 3.30	2.4739	20 35 4.5	12.674	12	11 0 29.95	2.1520	8 38 44.7	16.401
13	9 12 31.50	2.4661	20 22 20.2	12.801	13	11 2 38.92	2.1471	8 22 19.7	16.432
14	9 14 59.23	2.4583	20 9 28.4	12.924	14	11 4 47.60	2.1423	8 5 52.9	16.461
15	9 17 26.50	2.4506	19 56 29.3	13.046	15	11 6 56.00	2.1377	7 49 24.4	16.488
16	9 19 53.30	2.4428	19 43 22.9	13.167	16	11 9 4.12	2.1331	7 32 54.3	16.514
17	9 22 19.64	2.4352	19 30 9.3	13.285	17	11 11 11.97	2.1286	7 16 22.7	16.538
18	9 24 45.52	2.4274	19 16 48.7	13.400	18	11 13 19.55	2.1243	6 59 49.7	16.561
19	9 27 10.93	2.4197	19 3 21.3	13.513	19	11 15 26.88	2.1200	6 43 15.4	16.582
20	9 29 35.88	2.4120	18 49 47.1	13.624	20	11 17 33.95	2.1158	6 26 39.9	16.602
21	9 32 0.37	2.4043	18 36 6.3	13.734	21	11 19 40.77	2.1117	6 10 3.2	16.619
22	9 34 24.40	2.3967	18 22 19.0	13.841	22	11 21 47.35	2.1077	5 53 25.6	16.635
23	9 36 47.98	2.3892	18 8 25.4	13.946	23	11 23 53.69	2.1038	5 36 47.0	16.650
24	9 39 11.10	2.3816	N.17 54 25.5	14.049	24	11 25 59.80	2.1000	N. 5 20 7.6	16.663

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	SUNDAY 29.			
	h m s	s	° ′ ″	″
0	11 25 59.80	2.1000	N. 5 20 7.6	16.663
1	11 28 5.69	2.0963	5 3 27.5	16.674
2	11 30 11.36	2.0927	4 46 46.7	16.684
3	11 32 16.81	2.0892	4 30 5.4	16.692
4	11 34 22.06	2.0858	4 13 23.6	16.699
5	11 36 27.11	2.0825	3 56 41.5	16.704
6	11 38 31.96	2.0793	3 39 59.1	16.709
7	11 40 36.62	2.0761	3 23 16.4	16.712
8	11 42 41.09	2.0731	3 6 33.7	16.712
9	11 44 45.39	2.0702	2 49 51.0	16.712
10	11 46 49.52	2.0674	2 33 8.3	16.710
11	11 48 53.48	2.0647	2 16 25.8	16.707
12	11 50 57.28	2.0620	1 59 43.5	16.702
13	11 53 0.92	2.0595	1 43 1.5	16.696
14	11 55 4.42	2.0571	1 26 20.0	16.688
15	11 57 7.77	2.0548	1 9 38.9	16.680
16	11 59 10.99	2.0526	0 52 58.4	16.669
17	12 1 14.08	2.0504	0 36 18.6	16.657
18	12 3 17.04	2.0483	0 19 39.5	16.645
19	12 5 19.88	2.0463	N. 0 3 1.2	16.631
20	12 7 22.60	2.0445	S. 0 13 36.2	16.615
21	12 9 25.22	2.0428	0 30 12.6	16.598
22	12 11 27.74	2.0412	0 46 47.9	16.579
23	12 13 30.16	2.0396	S. 1 3 22.1	16.560
	MONDAY 30.			
0	12 15 32.49	2.0382	S. 1 19 55.1	16.539
1	12 17 34.74	2.0368	1 36 26.8	16.517
2	12 19 36.90	2.0354	1 52 57.1	16.493
3	12 21 38.99	2.0342	2 9 26.0	16.469
4	12 23 41.01	2.0332	2 25 53.4	16.443
5	12 25 42.97	2.0322	2 42 19.1	16.415
6	12 27 44.87	2.0312	2 58 43.2	16.387
7	12 29 46.72	2.0304	3 15 5.6	16.357
8	12 31 48.52	2.0298	3 31 26.1	16.326
9	12 33 50.29	2.0292	3 47 44.7	16.294
10	12 35 52.02	2.0286	4 4 1.4	16.262
11	12 37 53.72	2.0281	4 20 16.1	16.227
12	12 39 55.39	2.0278	4 36 28.6	16.190
13	12 41 57.05	2.0275	4 52 38 9	16.153
14	12 43 58.69	2.0273	5 8 47.0	16.115
15	12 46 0.32	2.0272	5 24 52.7	16.076
16	12 48 1.95	2.0272	5 40 56.1	16.036
17	12 50 3.58	2.0272	5 56 57.0	15.993
18	12 52 5.21	2.0273	6 12 55.3	15.950
19	12 54 6.86	2.0277	6 28 51.0	15.907
20	12 56 8.53	2.0280	6 44 44.1	15.862
21	12 58 10.22	2.0283	7 0 34.4	15.815
22	13 0 11.93	2.0288	7 16 21.9	15.767
23	13 2 13.68	2.0295	7 32 6.5	15.718
24	13 4 15.47	2.0302	S. 7 47 48.1	15.668

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
	TUESDAY 31.			
	h m s	s	° ′ ″	″
0	13 4 15.47	2.0302	S. 7 47 48.1	15.668
1	13 6 17.30	2.0309	8 3 26.7	15.618
2	13 8 19.18	2.0318	8 19 2.2	15.566
3	13 10 21.11	2.0327	8 34 34.6	15.513
4	13 12 23.10	2.0337	8 50 3.8	15.458
5	13 14 25.15	2.0347	9 5 29.6	15.403
6	13 16 27.26	2.0358	9 20 52.1	15.347
7	13 18 29.45	2.0372	9 36 11.2	15.288
8	13 20 31.72	2.0384	9 51 26.7	15.229
9	13 22 34.06	2.0397	10 6 38.7	15.170
10	13 24 36.49	2.0412	10 21 47.1	15.109
11	13 26 39.01	2.0427	10 36 51.8	15.047
12	13 28 41.62	2.0443	10 51 52.7	14.983
13	13 30 44.33	2.0461	11 6 49.8	14.919
14	13 32 47.15	2.0478	11 21 43.0	14.853
15	13 34 50.07	2.0496	11 36 32.2	14.787
16	13 36 53.10	2.0515	11 51 17.4	14.719
17	13 38 56.25	2.0535	12 5 58.5	14.650
18	13 40 59.52	2.0555	12 20 35.4	14.580
19	13 43 2.91	2.0576	12 35 8.1	14.509
20	13 45 6.43	2.0598	12 49 36.5	14.438
21	13 47 10.08	2.0620	13 4 0.6	14.365
22	13 49 13.87	2.0643	13 18 20.3	14.291
23	13 51 17.79	2.0666	S. 13 32 35.5	14.216
	WEDNESDAY, JANUARY 1, 1913.			
0	13 53 21.86	2.0690	S. 13 46 46.2	14.141

PHASES OF THE MOON.

			d	h	m
●	New Moon . . .	Dec.	8	5	6.7
☽	First Quarter		16	8	6.5
○	Full Moon		23	16	30.1
☾	Last Quarter		30	8	11.9

			d	h
☾	Apogee	Dec.	13	19.2
☾	Perigee		25	14.8

MERCURY, 1912.

GREENWICH MEAN TIME.

JANUARY.						FEBRUARY.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.
	Noon.	*Noon.*	*Noon.*	*Noon.*			*Noon.*	*Noon.*	*Noon.*	*Noon.*	
	h m s	s	° ′ ″	″	h m		h m s	s	° ′ ″	″	h m
1	17 39 50.31	− 6.415	−20 11 25.2	+ 3.10	22 55.0	1	19 34 22.04	+15.615	−22 32 40.7	+ 17.77	22 55.2
2	17 37 38.35	4.586	20 11 13.5	− 2.07	22 49.4	2	19 40 38.26	15.735	22 24 56.3	20.93	22 57.6
3	17 36 9.85	2.800	20 13 1.4	6.85	22 44.6	3	19 46 57.25	15.845	22 15 55.4	24.14	23 0.0
4	17 35 23.31	− 1.094	20 16 38.5	11.15	22 40.6	4	19 53 18.79	15.948	22 5 37.1	27.38	23 2.5
5	17 35 16.54	+ 0.510	20 21 52.2	14.89	22 37.1	5	19 59 42.69	16.042	21 54 0.7	30.65	23 5.0
6	17 35 46.90	+ 2.000	−20 28 28.7	−18.05	22 34.2	6	20 6 8.77	+16.129	−21 41 5.4	+ 33.96	23 7.5
7	17 36 51.61	3.372	20 36 14.1	20.63	22 31.9	7	20 12 36.85	16.210	21 26 50.5	37.29	23 10.1
8	17 38 27.82	4.626	20 44 54.4	22.63	22 30.0	8	20 19 6.80	16.285	21 11 15.5	40.64	23 12.7
9	17 40 32.75	5.766	20 54 16.1	24.08	22 28.5	9	20 25 38.47	16.354	20 54 19.8	44.01	23 15.3
10	17 43 3.74	6.799	21 4 6.6	25.04	22 27.5	10	20 32 11.74	16.418	20 36 3.0	47.40	23 17.9
11	17 45 58.34	+ 7.734	−21 14 14.4	−25.53	22 26.8	11	20 38 46.51	+16.478	−20 16 24.5	+ 50.81	23 20.6
12	17 49 14.26	8.578	21 24 28.7	25.59	22 26.4	12	20 45 22.67	16.535	19 55 24.0	54.23	23 23.3
13	17 52 49.44	9.340	21 34 39.9	25.28	22 26.3	13	20 52 0.14	16.588	19 33 1.2	57.67	23 26.0
14	17 56 42.00	10.028	21 44 39.3	24.62	22 26.5	14	20 58 38.86	16.638	19 9 15.8	61.12	23 28.7
15	18 0 50.25	10.649	21 54 18.9	23.65	22 26.9	15	21 5 18.77	16.686	18 44 7.4	64.58	23 31.5
16	18 5 12.67	+11.210	−22 3 31.9	−22.39	22 27.5	16	21 11 59.80	+16.732	−18 17 35.9	+ 68.05	23 34.2
17	18 9 47.92	11.718	22 12 12.3	20.90	22 28.4	17	21 18 41.91	16.777	17 49 41.1	71.52	23 37.0
18	18 14 34.77	12.178	22 20 14.2	19.20	22 29.4	18	21 25 25.08	16.820	17 20 22.9	75.00	23 39.8
19	18 19 32.14	12.595	22 27 32.8	17.32	22 30.5	19	21 32 9.29	16.863	16 49 41.1	78.48	23 42.6
20	18 24 39.05	12.974	22 34 3.9	15.26	22 31.9	20	21 38 54.52	16.905	16 17 35.8	81.96	23 45.5
21	18 29 54.64	+13.319	−22 39 43.6	−13.03	22 33.3	21	21 45 40.76	+16.947	−15 44 7.0	+ 85.44	23 48.3
22	18 35 18.12	13.633	22 44 28.4	10.68	22 34.8	22	21 52 28.00	16.989	15 9 14.7	88.91	23 51.2
23	18 40 48.79	13.919	22 48 15.3	8.21	22 36.5	23	21 59 16.26	17.032	14 32 59.2	92.37	23 54.1
24	18 46 26.02	14.180	22 51 1.4	5.63	22 38.3	24	22 6 5.55	17.075	13 55 20.9	95.82	23 57.0
25	18 52 9.25	14.418	22 52 44.4	2.95	22 40.2	25	22 12 55.87	17.118	13 16 20.0	99.26	23 59.9
26	18 57 57.95	+14.637	−22 53 22.1	− 0.18	22 42.1	26	22 19 47.22	+17.161	−12 35 57.1	+102.66	. . .
27	19 3 51.67	14.837	22 52 52.6	+ 2.66	22 44.2	27	22 26 39.62	17.205	11 54 13.0	106.02	0 2.8
28	19 9 49.97	15.020	22 51 14.1	5.57	22 46.3	28	22 33 33.06	17.248	11 11 8.6	109.34	0 5.8
29	19 15 52.49	15.187	22 48 25.0	8.54	22 48.4	29	22 40 27.53	17.290	10 26 45.0	112.61	0 8.8
30	19 21 58.88	15.342	22 44 23.9	11.57	22 50.6	30	22 47 23.00	17.331	9 41 3.7	115.81	0 11.7
31	19 28 8.83	+15.485	−22 39 9.5	+14.64	22 52.9	31	22 54 19.44	+17.371	− 8 54 6.4	+118.94	0 14.7
32	19 34 22.04	+15.615	−22 32 40.7	+17.77	22 55.2	32	23 1 16.78	+17.407	− 8 5 55.4	+121.96	0 17.7

Day of the Month.	1st.	6th.	11th.	16th.	21st.	26th.	31st.
	″	″	″	″	″	″	″
Semidiameter. . . .	4.57	4.05	3.61	3.27	3.01	2.83	2.68
Horizontal Parallax	12.03	10.69	9.51	8.61	7.94	7.45	7.07

Day of the Month.	5th.	10th.	15th.	20th.	25th.
	″	″	″	″	″
Semidiameter	2.58	2.50	2.45	2.42	2.41
Horizontal Parallax	6.79	6.59	6.45	6.37	6.36

Note.—The sign + indicates north declinations; the sign − indicates south declinations.

MERCURY, 1912.

GREENWICH MEAN TIME.

MARCH.						APRIL.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.
	Noon.	*Noon.*	*Noon.*	*Noon.*			*Noon.*	*Noon.*	*Noon.*	*Noon.*	
	h m s	s	° ′ ″	″	h m		h m s	s	° ′ ″	″	h m
1	22 47 23.00	+17.331	− 9 41 3.7	+115.81	0 11.7	1	1 42 53.15	+4.030	+13 56 42.7	+36.45	1 4.9
2	22 54 19.44	17.371	8 54 6.4	118.94	0 14.7	2	1 44 17.07	2.963	14 9 25.3	27.09	1 2.3
3	23 1 16.78	17.407	8 5 55.4	121.96	0 17.7	3	1 45 15.44	1.903	14 18 21.9	17.62	0 59.3
4	23 8 14.91	17.437	7 16 33.3	124.86	0 20.8	4	1 45 48.58	+0.862	14 23 30.7	+ 8.11	0 55.9
5	23 15 13.69	17.461	6 26 3.4	127.61	0 23.8	5	1 45 57.08	−0.148	14 24 51.2	− 1.39	0 52.1
6	23 22 12.94	+17.475	− 5 34 29.5	+130.19	0 26.9	6	1 45 41.80	−1.116	+14 22 24.7	−10.79	0 47.9
7	23 29 12.39	17.477	4 41 56.2	132.55	0 29.9	7	1 45 3.91	2.029	14 16 14.6	20.01	0 43.4
8	23 36 11.73	17.465	3 48 29.0	134.67	0 33.0	8	1 44 4.91	2.874	14 6 26.5	28.95	0 38.5
9	23 43 10.56	17.434	2 54 14.3	136.50	0 36.0	9	1 42 46.58	3.638	13 53 8.7	37.47	0 33.2
10	23 50 8.40	17.381	1 59 19.5	138.00	0 39.1	10	1 41 11.03	4.308	13 36 32.4	45.46	0 27.7
11	23 57 4.64	+17.301	− 1 3 53.1	+139.12	0 42.1	11	1 39 20.62	−4.874	+13 16 52.0	−52.79	0 21.9
12	0 3 58.59	17.189	− 0 8 4.9	139.82	0 45.0	12	1 37 17.96	5.328	12 54 24.8	59.34	0 15.9
13	0 10 49.42	17.040	+ 0 47 54.4	140.04	0 47.9	13	1 35 5.84	5.662	12 29 31.0	64.98	0 9.8
14	0 17 36.19	16.850	1 43 52.8	139.73	0 50.8	14	1 32 47.17	5.874	12 2 33.6	69.62	0 3.6 23 57.3
15	0 24 17.83	16.612	2 39 37.1	138.85	0 53.5	15	1 30 24.89	5.963	11 33 57.8	73.17	23 51.0
16	0 30 53.14	+16.322	+ 3 34 53.0	+137.37	0 56.1	16	1 28 1.94	−5.931	+11 4 10.3	−75.59	23 44.8
17	0 37 20.83	15.976	4 29 25.7	135.25	0 58.7	17	1 25 41.15	5.783	10 33 38.6	76.85	23 38.6
18	0 43 39.52	15.570	5 22 59.6	132.47	1 1.0	18	1 23 25.21	5.528	10 2 50.3	76.97	23 32.5
19	0 49 47.74	15.103	6 15 18.9	129.03	1 3.2	19	1 21 16.58	5.176	9 32 12.6	75.99	23 26.6
20	0 55 43.97	14.572	7 6 7.7	124.92	1 5.3	20	1 19 17.47	4.737	9 2 11.1	73.98	23 20.9
21	1 1 26.66	+13.976	+ 7 55 10.1	+120.17	1 7.0	21	1 17 29.80	−4.224	+ 8 33 9.4	−71.02	23 15.4
22	1 6 54.28	13.316	8 42 11.0	114.81	1 8.5	22	1 15 55.19	3.650	8 5 28.9	67.23	23 10.1
23	1 12 5.33	12.595	9 26 56.2	108.86	1 9.7	23	1 14 34.97	3.027	7 39 28.3	62.71	23 5.1
24	1 16 58.35	11.814	10 9 12.1	102.37	1 10.6	24	1 13 30.17	2.367	7 15 23.4	57.60	23 0.4
25	1 21 31.97	10.978	10 48 46.1	95.39	1 11.2	25	1 12 41.55	1.681	6 53 27.1	52.02	22 55.9
26	1 25 44.91	+10.092	+11 25 27.0	+ 87.96	1 11.5	26	1 12 9.62	−0.978	+ 6 33 49.4	−46.07	22 51.7
27	1 29 36.01	9.160	11 59 4.7	80.13	1 11.4	27	1 11 54.66	−0.268	6 16 37.9	39.85	22 47.8
28	1 33 4.25	8.188	12 29 30.1	71.94	1 10.9	28	1 11 56.76	+0.443	6 1 57.8	33.46	22 44.2
29	1 36 8.73	7.181	12 56 35.2	63.44	1 10.0	29	1 12 15.87	1.148	5 49 52.2	26.99	22 40.8
30	1 38 48.71	6.148	13 20 13.0	54.66	1 8.7	30	1 12 51.79	1.843	5 40 22.1	20.51	22 37.7
31	1 41 3.64	+ 5.095	+13 40 17.2	+ 45.65	1 7.0	31	1 13 44.22	+2.524	+ 5 33 27.1	−14.08	22 34.9
32	1 42 53.15	+ 4.030	+13 56 42.7	+ 36.45	1 4.9	32	1 14 52.80	+3.188	+ 5 29 5.7	− 7.73	22 32.4

Day of the Month.	1st.	6th.	11th.	16th.	21st.	26th.	31st.
	″	″	″	″	″	″	″
Semidiameter	2.43	2.50	2.61	2.81	3.13	3.58	4.15
Horizontal Parallax	6.41	6.58	6.89	7.42	8.25	9.43	10.94

Day of the Month.	5th.	10th.	15th.	20th.	25th.	30th.
	″	″	″	″	″	″
Semidiameter	4.79	5.39	5.77	5.82	5.58	5.18
Horizontal Parallax . .	12.64	14.20	15.20	15.34	14.71	13.65

The sign + prefixed to the hourly change of declination indicates that south declinations are decreasing, or north declinations increasing. The sign − indicates that north declinations are decreasing.

MERCURY, 1912.

GREENWICH MEAN TIME.

MAY.						JUNE.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.
	Noon.	*Noon.*	*Noon.*	*Noon.*			*Noon.*	*Noon.*	*Noon.*	*Noon.*	
	h m s	s	° ′ ″	″	h m		h m s	s	° ′ ″	″	h m
1	1 13 44.22	+ 2.524	+ 5 33 27.1	−14.08	22 34.9	1	3 24 32.80	+17.695	+16 52 22.2	+90.20	22 49.2
2	1 14 52.80	3.188	5 29 5.7	7.73	22 32.4	2	3 31 43.55	18.203	17 28 23.5	89.85	22 52.7
3	1 16 17.08	3.832	5 27 15.3	− 1.51	22 30.1	3	3 39 6.58	18.717	18 4 12.0	89.14	22 56.3
4	1 17 56.58	4.456	5 27 52.2	+ 4.55	22 28.0	4	3 46 42.01	19.235	18 39 38.7	88.04	23 0.2
5	1 19 50.83	5.061	5 30 52.5	10.43	22 26.2	5	3 54 29.89	19.754	19 14 34.2	86.52	23 4.2
6	1 21 59.33	+ 5.645	+ 5 36 11.6	+16.12	22 24.6	6	4 2 30.22	+20.271	+19 48 48.1	+84.56	23 8.5
7	1 24 21.59	6.207	5 43 44.6	21.60	22 23.2	7	4 10 42.88	20.781	20 22 9.2	82.13	23 13.0
8	1 26 57.12	6.750	5 53 26.5	26.86	22 22.1	8	4 19 7.63	21.278	20 54 26.3	79.21	23 17.7
9	1 29 45.47	7.276	6 5 12.0	31.90	22 21.1	9	4 27 44.09	21.756	21 25 27.5	75.79	23 22.5
10	1 32 46.22	7.784	6 18 55.9	36.73	22 20.4	10	4 36 31.72	22.208	21 55 0.6	71.86	23 27.6
11	1 35 58.97	+ 8.276	+ 6 34 32.9	+41.34	22 19.9	11	4 45 29.81	+22.627	+22 22 53.1	+67.42	23 32.8
12	1 39 23.35	8.754	6 51 57.9	45.73	22 19.5	12	4 54 37.47	23.005	22 48 53.1	62.49	23 38.1
13	1 42 59.04	9.219	7 11 5.8	49.90	22 19.3	13	5 3 53.65	23.335	23 12 48.9	57.08	23 43.6
14	1 46 45.74	9.672	7 31 51.4	53.86	22 19.3	14	5 13 17.12	23.611	23 34 29.6	51.23	23 49.2
15	1 50 43.21	10.115	7 54 9.8	57.63	22 19.5	15	5 22 46.49	23.827	23 53 45.3	45.01	23 54.8
16	1 54 51.24	+10.552	+ 8 17 56.2	+61.19	22 19.9	16	5 32 20.28	+23.978	+24 10 27.7	+38.47	. . .
17	1 59 9.67	10.983	8 43 5.6	64.55	22 20.4	17	5 41 56.90	24.062	24 24 29.7	31.67	0 0.5
18	2 3 38.36	11.408	9 9 33.4	67.72	22 21.1	18	5 51 34.74	24.079	24 35 46.3	24.70	0 6.2
19	2 8 17.21	11.830	9 37 14.8	70.70	22 22.0	19	6 1 12.16	24.028	24 44 14.1	17.62	0 11.9
20	2 13 6.18	12.251	10 6 5.3	73.48	22 23.0	20	6 10 47.56	23.912	24 49 51.9	10.53	0 17.6
21	2 18 5.27	+12.673	+10 36 0.3	+76.07	22 24.2	21	6 20 19.44	+23.735	+24 52 40.1	+ 3.49	0 23.2
22	2 23 14.50	13.096	11 6 55.1	78.46	22 25.5	22	6 29 46.40	23.502	24 52 40.7	− 3.43	0 28.7
23	2 28 33.92	13.523	11 38 44.9	80.65	22 27.1	23	6 39 7.14	23.218	24 49 57.2	10.17	0 34.1
24	2 34 3.65	13.955	12 11 25.1	82.65	22 28.8	24	6 48 20.51	22.889	24 44 34.6	16.68	0 39.4
25	2 39 43.81	14.393	12 44 50.8	84.45	22 30.7	25	6 57 25.52	22.522	24 36 38.8	22.92	0 44.5
26	2 45 34.55	+14.838	+13 18 56.9	+86.03	22 32.8	26	7 6 21.32	+22.123	+24 26 16.7	−28.87	0 49.5
27	2 51 36.07	15.291	13 53 38.0	87.38	22 35.0	27	7 15 7.22	21.698	24 13 35.5	34.51	0 54.4
28	2 57 48.56	15.752	14 28 48.6	88.49	22 37.5	28	7 23 42.64	21.251	23 58 42.9	39.82	0 59.0
29	3 4 12.25	16.223	15 4 22.8	89.34	22 40.1	29	7 32 7.13	20.788	23 41 47.1	44.78	1 3.5
30	3 10 47.37	16.704	15 40 14.4	89.92	22 43.0	30	7 40 20.36	20.314	23 22 56.1	49.40	1 7.8
31	3 17 34.15	+17.194	+16 16 16.6	+90.21	22 46.0	31	7 48 22.10	+19.831	+23 2 18.1	−53.70	1 11.9
32	3 24 32.80	+17.695	+16 52 22.2	+90.20	22 49.2	32	7 56 12.18	+19.342	+22 40 0.9	−57.66	1 15.8

Day of the Month.	5th.	10th.	15th.	20th.	25th.	30th.	Day of the Month.	4th.	9th.	14th.	19th.	24th.	29th.
	″	″	″	″	″	″		″	″	″	″	″	″
Semidiameter	4.72	4.28	3.89	3.53	3.23	2.98	Semidiameter	2.78	2.63	2.54	2.52	2.57	2.68
Horizontal Parallax . .	12.45	11.29	10.24	9.31	8.52	7.85	Horizontal Parallax . .	7.31	6.92	6.69	6.65	6.78	7.06

Note.—The sign + indicates north declinations; the sign − indicates south declinations.

MERCURY, 1912.

GREENWICH MEAN TIME.

JULY.						AUGUST.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.
	Noon.	*Noon.*	*Noon.*	*Noon.*			*Noon.*	*Noon.*	*Noon.*	*Noon.*	
	h m s	s	° ′ ″	″	h m		h m s	s	° ′ ″	″	h m
1	7 48 22.10	+19.831	+23 2 18.1	−53.70	1 11.9	1	10 22 2.19	+4.428	+ 7 31 23.7	−58.77	1 43.0
2	7 56 12.18	19.342	22 40 0.9	57.66	1 15.8	2	10 23 40.69	3.776	7 8 38.5	54.94	1 40.7
3	8 3 50.51	18.852	22 16 12.6	61.30	1 19.5	3	10 25 3.27	3.101	6 47 29.7	50.75	1 38.1
4	8 11 17.06	18.361	21 51 0.7	64.63	1 23.0	4	10 26 9.37	2.403	6 28 5.7	46.20	1 35.2
5	8 18 31.84	17.871	21 24 32.6	67.66	1 26.3	5	10 26 58.43	1.682	6 10 35.1	41.29	1 32.1
6	8 25 34.90	+17.384	+20 56 55.4	−70.40	1 29.4	6	10 27 29.91	+0.939	+ 5 55 6.8	−36.01	1 28.7
7	8 32 26.30	16.900	20 28 16.0	72.85	1 32.3	7	10 27 43.31	+0.176	5 41 49.8	30.34	1 25.0
8	8 39 6.14	16.420	19 58 40.9	75.03	1 35.0	8	10 27 38.20	−0.603	5 30 53.3	24.30	1 20.9
9	8 45 34.51	15.944	19 28 16.4	76.96	1 37.5	9	10 27 14.24	1.395	5 22 26.2	17.90	1 16.6
10	8 51 51.51	15.472	18 57 8.7	78.64	1 39.8	10	10 26 31.20	2.192	5 16 37.0	11.15	1 11.9
11	8 57 57.23	+15.004	+18 25 23.7	−80.08	1 42.0	11	10 25 29.05	−2.987	+ 5 13 33.6	− 4.08	1 6.9
12	9 3 51.77	14.540	17 53 7.0	81.28	1 43.9	12	10 24 7.94	3.770	5 13 23.0	+ 3.25	1 1.6
13	9 9 35.20	14.079	17 20 24.1	82.26	1 45.7	13	10 22 28.28	4.530	5 16 10.8	10.77	0 56.1
14	9 15 7.58	13.620	16 47 20.4	83.02	1 47.3	14	10 20 30.78	5.254	5 22 0.6	18.40	0 50.2
15	9 20 28.97	13.163	16 14 1.2	83.56	1 48.7	15	10 18 16.50	5.926	5 30 53.8	26.03	0 44.0
16	9 25 39.39	+12.705	+15 40 31.5	−83.89	1 49.9	16	10 15 46.88	−6.529	+ 5 42 49.2	+33.55	0 37.6
17	9 30 38.83	12.247	15 6 56.5	84.00	1 51.0	17	10 13 3.79	7.045	5 57 42.2	40.81	0 30.9
18	9 35 27.26	11.788	14 33 21.1	83.91	1 51.8	18	10 10 9.52	7.458	6 15 24.7	47.65	0 24.1
19	9 40 4.65	11.327	13 59 50.4	83.62	1 52.5	19	10 7 6.78	7.749	6 35 44.9	53.92	0 17.1
20	9 44 30.90	10.861	13 26 29.3	83.11	1 53.0	20	10 3 58.68	7.902	6 58 26.9	59.45	0 10.1
21	9 48 45.92	+10.389	+12 53 22.9	−82.39	1 53.3	21	10 0 48.69	−7.905	+ 7 23 11.2	+64.09	0 3.0 23 56.0
22	9 52 49.55	9.911	12 20 36.3	81.46	1 53.4	22	9 57 40.53	7.747	7 49 35.0	67.71	23 49.1
23	9 56 41.61	9.425	11 48 14.8	80.31	1 53.3	23	9 54 38.11	7.425	8 17 12.5	70.22	23 42.3
24	10 0 21.90	8.930	11 16 23.5	78.93	1 53.0	24	9 51 45.41	6.938	8 45 36.1	71.54	23 35.7
25	10 3 50.16	8.423	10 45 7.9	77.32	1 52.5	25	9 49 6.38	6.288	9 14 16.7	71.64	23 29.4
26	10 7 6.11	+ 7.903	+10 14 33.7	−75.48	1 51.8	26	9 46 44.79	−5.486	+ 9 42 44.9	+70.52	23 23.5
27	10 10 9.41	7.369	9 44 46.7	73.39	1 50.9	27	9 44 44.15	4.544	10 10 31.8	68.20	23 17.9
28	10 12 59.70	6.819	9 15 53.0	71.04	1 49.8	28	9 43 7.62	3.480	10 37 9.4	64.75	23 12.8
29	10 15 36.59	6.251	8 47 59.1	68.42	1 48.4	29	9 41 57.92	2.312	11 2 11.6	60.27	23 8.2
30	10 17 59.62	5.664	8 21 11.5	65.51	1 46.8	30	9 41 17.31	−1.060	11 25 14.7	54.84	23 4.1
31	10 20 8.32	+ 5.057	+ 7 55 37.3	−62.30	1 45.0	31	9 41 7.54	+0.254	+11 45 57.2	+48.57	23 0.5
32	10 22 2.19	+ 4.428	+ 7 31 23.7	−58.77	1 43.0	32	9 41 29.83	+1.609	+12 4 0.0	+41.56	22 57.5

Day of the Month.	4th.	9th.	14th.	19th.	24th.	29th.	Day of the Month.	3d.	8th.	13th.	18th.	23d.	28th.
	″	″	″	″	″	″		″	″	″	″	″	″
Semidiameter . . .	2.83	3.01	3.23	3.49	3.79	4.13	Semidiameter . . .	4.51	4.91	5.26	5.44	5.32	4.87
Horizontal Parallax	7.45	7.93	8.51	9.19	9.97	10.87	Horizontal Parallax	11.88	12.93	13.86	14.35	14.02	12.84

The sign — prefixed to the hourly change of declination indicates that north declinations are decreasing; the sign + indicates that north declinations are increasing.

MERCURY, 1912.

GREENWICH MEAN TIME.

	SEPTEMBER.						OCTOBER.				
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.
	Noon.	*Noon.*	*Noon.*	*Noon.*			*Noon.*	*Noon.*	*Noon.*	*Noon.*	
	h m s	s	° ′ ″	″	h m		h m s	s	° ′ ″	″	h m
1	9 41 29.83	+ 1.609	+12 4 0.0	+ 41.56	22 57.5	1	12 23 25.02	+16.091	− 0 57 36.9	−116.91	23 46.5
2	9 42 24.89	2.982	12 19 6.9	33.93	22 55.0	2	12 29 49.82	15.976	1 44 19.1	116.58	23 48.9
3	9 43 52.96	4.355	12 31 4.3	25.78	22 53.0	3	12 36 11.90	15.864	2 30 51.0	116.07	23 51.3
4	9 45 53.80	5.710	12 39 40.8	17.21	22 51.6	4	12 42 31.35	15.757	3 17 8.9	115.40	23 53.6
5	9 48 26.74	7.028	12 44 47.8	+ 8.34	22 50.7	5	12 48 48.31	15.656	4 3 9.3	114.61	23 55.9
6	9 51 30.71	+ 8.293	+12 46 19.1	− 0.75	22 50.3	6	12 55 2.89	+15.560	− 4 48 49.1	−113.69	23 58.2
7	9 55 4.29	9.494	12 44 10.8	9.96	22 50.4	7	13 1 15.23	15.470	5 34 5.5	112.66	. . .
8	9 59 5.79	10.617	12 38 21.2	19.17	22 50.9	8	13 7 25.49	15.387	6 18 56.0	111.54	0 0.4
9	10 3 33.22	11.653	12 28 51.3	28.30	22 51.8	9	13 13 33.81	15.310	7 3 18.4	110.31	0 2.6
10	10 8 24.40	12.595	12 15 44.3	37.25	22 53.0	10	13 19 40.36	15.239	7 47 10.4	109.01	0 4.8
11	10 13 37.02	+13.439	+11 59 5.6	− 45.92	22 54.6	11	13 25 45.30	+15.175	− 8 30 30.3	−107.63	0 6.9
12	10 19 8.67	14.182	11 39 2.9	54.24	22 56.4	12	13 31 48.78	15.117	9 13 16.3	106.19	0 9.1
13	10 24 56.92	14.823	11 15 45.5	62.13	22 58.5	13	13 37 50.96	15.066	9 55 26.7	104.67	0 11.2
14	10 30 59.37	15.365	10 49 24.4	69.54	23 0.8	14	13 43 51.97	15.021	10 36 59.9	103.09	0 13.2
15	10 37 13.69	15.813	10 20 12.0	76.40	23 3.3	15	13 49 51.97	14.981	11 17 54.6	101.46	0 15.3
16	10 43 37.70	+16.173	+ 9 48 21.9	− 82.68	23 5.9	16	13 55 51.10	+14.947	−11 58 9.4	− 99.77	0 17.3
17	10 50 9.36	16.452	9 14 8.1	88.37	23 8.6	17	14 1 49.48	14.919	12 37 42.8	98.02	0 19.4
18	10 56 46.82	16.658	8 37 44.8	93.47	23 11.3	18	14 7 47.25	14.896	13 16 33.8	96.22	0 21.4
19	11 3 28.44	16.800	7 59 26.2	97.98	23 14.1	19	14 13 44.52	14.877	13 54 41.0	94.37	0 23.4
20	11 10 12.78	16.886	7 19 26.3	101.92	23 16.9	20	14 19 41.40	14.863	14 32 3.1	92.47	0 25.4
21	11 16 58.59	+16.924	+ 6 37 58.6	−105.31	23 19.8	21	14 25 37.98	+14.853	−15 8 39.0	− 90.52	0 27.4
22	11 23 44.83	16.923	5 55 15.8	108.18	23 22.6	22	14 31 34.35	14.846	15 44 27.5	88.52	0 29.4
23	11 30 30.66	16.890	5 11 29.8	110.57	23 25.4	23	14 37 30.58	14.842	16 19 27.4	86.47	0 31.4
24	11 37 15.36	16.831	4 26 51.6	112.53	23 28.2	24	14 43 26.74	14.840	16 53 37.4	84.36	0 33.4
25	11 43 58.39	16.752	3 41 31.3	114.09	23 30.9	25	14 49 22.88	14.840	17 26 56.3	82.21	0 35.4
26	11 50 39.33	+16.658	+ 2 55 38.1	−115.28	23 33.6	26	14 55 19.04	+14.841	−17 59 22.9	− 80.00	0 37.4
27	11 57 17.88	16.553	2 9 20.3	116.14	23 36.3	27	15 1 15.23	14.842	18 30 55.9	77.74	0 39.4
28	12 3 53.83	16.441	1 22 45.6	116.70	23 38.9	28	15 7 11.45	14.842	19 1 34.0	75.43	0 41.4
29	12 10 27.03	16.325	+ 0 36 0.6	117.00	23 41.5	29	15 13 7.68	14.842	19 31 15.8	73.05	0 43.4
30	12 16 57.43	16.208	− 0 10 48.7	117.06	23 44.0	30	15 19 3.89	14.840	20 0 0.0	70.62	0 45.4
31	12 23 25.02	+16.091	− 0 57 36.9	−116.91	23 46.5	31	15 25 0.00	+14.835	−20 27 45.3	− 68.13	0 47.4
32	12 29 49.82	+15.976	− 1 44 19.1	−116.58	23 48.9	32	15 30 55.93	+14.825	−20 54 30.1	− 65.58	0 49.4

Day of the Month.	2d.	7th.	12th.	17th.	22d.	27th.	Day of the Month.	2d.	7th.	12th.	17th.	22d.	27th.
	″	″	″	″	″	″		″	″	″	″	″	″
Semidiameter	4.25	3.65	3.17	2.83	2,61	2.47	Semidiameter	2.40	2,36	2.35	2.36	2.40	2.46
Horizontal Parallax . . .	11.21	9.61	8.34	7.45	6.88	6.52	Horizontal Parallax . . .	6.31	6.21	6.19	6.23	6.33	6.49

NOTE.—The sign + indicates north declinations; the sign − indicates south declinations.

MERCURY, 1912.

GREENWICH MEAN TIME.

NOVEMBER.						DECEMBER.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.
	Noon.	*Noon.*	*Noon.*	*Noon.*			*Noon.*	*Noon.*	*Noon.*	*Noon.*	
	h m s	s	° ′ ″	″	h m		h m s	s	° ′ ″	″	h m
1	15 30 55.93	+14.825	−20 54 30.1	−65.58	0 49.4	1	17 34 20.87	− 4.539	−24 9 36.5	+44.28	0 54.3
2	15 36 51.55	14.809	21 20 12.9	62.97	0 51.4	2	17 32 7.90	6.542	23 50 55.8	49.10	0 48.1
3	15 42 46.71	14.786	21 44 52.2	60.29	0 53.3	3	17 29 7.28	8.496	23 30 20.7	53.80	0 41.2
4	15 48 41.22	14.754	22 8 26.4	57.55	0 55.3	4	17 25 21.19	10.315	23 7 56.1	58.19	0 33.5
5	15 54 34.84	14.712	22 30 54.0	54.73	0 57.3	5	17 20 53.95	11.908	22 43 52.4	62.01	0 25.1
6	16 0 27.30	+14.657	−22 52 13.2	−51.85	0 59.2	6	17 15 52.17	−13.178	−22 18 27.0	+64.94	0 16.2
7	16 6 18.26	14.587	23 12 22.3	48.89	1 1.1	7	17 10 24.64	14.042	21 52 5.2	66.64	0 6.8 23 57.2
8	16 12 7.34	14.500	23 31 19.7	45.87	1 3.0	8	17 4 41.88	14.441	21 25 20.2	66.81	23 47.5
9	16 17 54.10	14.393	23 49 3.6	42.77	1 4.8	9	16 58 55.42	14.349	20 58 52.1	65.22	23 38.0
10	16 23 37.99	14.262	24 5 32.1	39.59	1 6.6	10	16 53 16.99	13.777	20 33 24.6	61.76	23 28.8
11	16 29 18.42	+14.103	−24 20 43.6	−36.34	1 8.3	11	16 47 57.57	−12.775	−20 9 41.6	+56.53	23 20.1
12	16 34 54.69	13.914	24 34 36.2	33.02	1 10.0	12	16 43 6.62	11.419	19 48 23.0	49.78	23 11.9
13	16 40 26.02	13.690	24 47 8.1	29.62	1 11.6	13	16 38 51.59	9.799	19 30 1.3	41.86	23 4.4
14	16 45 51.48	13.425	24 58 17.4	26.14	1 13.1	14	16 35 17.69	8.007	19 14 59.5	33.20	22 57.6
15	16 51 10.04	13.114	25 8 2.5	22.60	1 14.4	15	16 32 27.97	6.130	19 3 30.5	24.21	22 51.6
16	16 56 20.54	+12.751	−25 16 21.7	−18.98	1 15.6	16	16 30 23.57	− 4.241	−18 55 37.3	+15.27	22 46.3
17	17 1 21.61	12.328	25 23 13.0	15.29	1 16.7	17	16 29 4.08	2.395	18 51 14.5	+ 6.71	22 41.8
18	17 6 11.73	11.838	25 28 34.9	11.53	1 17.6	18	16 28 27.93	− 0.634	18 50 10.6	− 1.26	22 37.9
19	17 10 49.19	11.271	25 32 25.7	7.70	1 18.3	19	16 28 32.77	+ 1.017	18 52 9.2	8.48	22 34.6
20	17 15 12.05	10.619	25 34 43.8	− 3.80	1 18.7	20	16 29 15.77	2.545	18 56 51.2	14.86	22 32.0
21	17 19 18.14	+ 9.872	−25 35 27.5	+ 0.17	1 18.9	21	16 30 33.92	+ 3.944	−19 3 55.8	−20.39	22 29.8
22	17 23 5.05	9.019	25 34 35.3	4.20	1 18.7	22	16 32 24.11	5.216	19 13 2.9	25.07	22 28.2
23	17 26 30.11	8.049	25 32 5.5	8.30	1 18.1	23	16 34 43.34	6.366	19 23 52.4	28.93	22 27.0
24	17 29 30.39	6.952	25 27 56.3	12.47	1 17.1	24	16 37 28.79	7.402	19 36 5.3	32.03	22 26.2
25	17 32 2.70	5.718	25 22 6.1	16.72	1 15.7	25	16 40 37.83	8.334	19 49 24.1	34.43	22 25.7
26	17 34 3.70	+ 4.341	−25 14 32.8	+21.06	1 13.8	26	16 44 8.05	+ 9.170	−20 3 32.7	−36.19	22 25.6
27	17 35 29.91	2.818	25 5 14.1	25.50	1 11.2	27	16 47 57.29	9.920	20 18 16.5	37.37	22 25.7
28	17 36 17.84	+ 1.152	24 54 7.6	30.05	1 8.1	28	16 52 3.61	10.593	20 33 22.3	38.04	22 26.1
29	17 36 24.15	− 0.647	24 41 10.8	34.70	1 4.2	29	16 56 25.25	11.199	20 48 38.6	38.25	22 26.7
30	17 35 45.90	2.557	24 26 21.1	39.46	0 59.6	30	17 1 0.68	11.744	21 3 55.1	38.05	22 27.6
31	17 34 20.87	− 4.539	−24 9 36.5	+44.28	0 54.3	31	17 5 48.54	+12.236	−21 19 2.4	−37.50	22 28.6
32	17 32 7.90	− 6.542	−23 50 55.8	+49.10	0 48.1	32	17 10 47.61	+12.680	−21 33 52.5	−36.63	22 29.8

Day of the Month.	1st.	6th.	11th.	16th.	21st.	26th.	Day of the Month.	1st.	6th.	11th.	16th.	21st.	26th.	31st.
	″	″	″	″	″	″		″	″	″	″	″	″	″
Semidiameter.	2.55	2.68	2.85	3.09	3.42	3.87	Semidiameter . . .	4.41	4.86	4.85	4.40	3.86	3.42	3.10
Horizontal Parallax . . .	6.73	7.06	7.52	8.14	9.01	10.19	Horizontal Parallax	11.63	12.81	12.78	11.59	10.17	9.01	8.16

The sign — prefixed to the hourly change of declination indicates that south declinations are increasing; the sign + indicates that south declinations are decreasing.

VENUS, 1912.

GREENWICH MEAN TIME.

JANUARY.						FEBRUARY.					
Day of Month.	Apparent Right Ascension. Noon.	Var. of R. A. for 1 Hour. Noon.	Apparent Declination. Noon.	Var. of Decl. for 1 Hour. Noon.	Meridian Passage.	Day of Month.	Apparent Right Ascension. Noon.	Var. of R. A. for 1 Hour. Noon.	Apparent Declination. Noon.	Var. of Decl. for 1 Hour. Noon.	Meridian Passage.
	h m s	s	° ′ ″	″	h m		h m s	s	° ′ ″	″	h m
1	15 37 55.10	+11.784	−16 48 39.0	−43.12	20 59.5	1	18 13 17.67	+13.042	−22 3 2.1	− 3.67	21 33.1
2	15 42 38.61	11.842	17 5 43.6	42.26	21 0.4	2	18 18 30.83	13.054	22 4 11.2	2.09	21 34.4
3	15 47 23.48	11.898	17 22 27.4	41.38	21 1.2	3	18 23 44.28	13.065	22 4 42.3	− 0.50	21 35.7
4	15 52 9.71	11.954	17 38 49.7	40.47	21 2.0	4	18 28 57.96	13.074	22 4 35.3	+ 1.09	21 37.0
5	15 56 57.29	12.010	17 54 49.6	39.52	21 2.8	5	18 34 11.82	13.081	22 3 50.0	2.69	21 38.2
6	16 1 46.20	+12.066	−18 10 26.4	−38.54	21 3.7	6	18 39 25.81	+13.084	−22 2 26.3	+ 4.29	21 39.5
7	16 6 36.44	12.121	18 25 39.2	37.52	21 4.6	7	18 44 39.87	13.086	22 0 24.2	5.89	21 40.8
8	16 11 27.99	12.175	18 40 27.3	36.48	21 5.6	8	18 49 53.94	13.086	21 57 43.7	7.49	21 42.1
9	16 16 20.83	12.228	18 54 49.9	35.40	21 6.6	9	18 55 7.98	13.083	21 54 24.7	9.09	21 43.4
10	16 21 14.94	12.280	19 8 46.3	34.29	21 7.5	10	19 0 21.92	13.077	21 50 27.3	10.70	21 44.7
11	16 26 10.29	+12.332	−19 22 15.7	−33.15	21 8.5	11	19 5 35.69	+13.070	−21 45 51.4	+12.30	21 46.0
12	16 31 6.86	12.382	19 35 17.2	31.98	21 9.5	12	19 10 49.26	13.060	21 40 37.2	13.89	21 47.2
13	16 36 4.62	12.431	19 47 50.3	30.78	21 10.5	13	19 16 2.57	13.048	21 34 44.8	15.48	21 48.5
14	16 41 3.53	12.478	19 59 54.2	29.55	21 11.6	14	19 21 15.57	13.034	21 28 14.4	17.06	21 49.8
15	16 46 3.57	12.525	20 11 28.2	28.29	21 12.7	15	19 26 28.21	13.018	21 21 6.2	18.63	21 51.1
16	16 51 4.70	+12.570	−20 22 31.9	−27.01	21 13.8	16	19 31 40.43	+13.000	−21 13 20.3	+20.19	21 52.4
17	16 56 6.88	12.613	20 33 4.5	25.70	21 14.9	17	19 36 52.19	12.979	21 4 57.0	21.74	21 53.6
18	17 1 10.09	12.654	20 43 5.2	24.36	21 16.0	18	19 42 3.43	12.956	20 55 56.6	23.28	21 54.8
19	17 6 14.27	12.694	20 52 33.6	23.00	21 17.1	19	19 47 14.11	12.933	20 46 19.3	24.81	21 56.0
20	17 11 19.38	12.732	21 1 29.1	21.62	21 18.3	20	19 52 24.20	12.907	20 36 5.6	26.33	21 57.2
21	17 16 25.39	+12.769	−21 9 51.2	−20.22	21 19.5	21	19 57 33.64	+12.879	−20 25 15.7	+27.83	21 58.5
22	17 21 32.26	12.803	21 17 39.4	18.80	21 20.7	22	20 2 42.41	12.850	20 13 50.0	29.31	21 59.7
23	17 26 39.93	12.836	21 24 53.2	17.35	21 21.9	23	20 7 50.46	12.820	20 1 49.0	30.77	22 0.9
24	17 31 48.36	12.867	21 31 32.1	15.89	21 23.1	24	20 12 57.76	12.788	19 49 13.0	32.22	22 2.1
25	17 36 57.52	12.896	21 37 35.7	14.41	21 24.3	25	20 18 4.27	12.754	19 36 2.5	33.65	22 3.2
26	17 42 7.34	+12.922	−21 43 3.6	−12.91	21 25.5	26	20 23 9.97	+12.720	−19 22 18.0	+35.06	22 4.3
27	17 47 17.78	12.947	21 47 55.4	11.40	21 26.7	27	20 28 14.84	12.685	19 7 59.9	36.45	22 5.4
28	17 52 28.80	12.971	21 52 10.8	9.88	21 28.0	28	20 33 18.85	12.649	18 53 8.6	37.82	22 6.5
29	17 57 40.35	12.992	21 55 49.4	8.34	21 29.3	29	20 38 21.98	12.612	18 37 44.7	39.17	22 7.6
30	18 2 52.38	13.010	21 58 51.0	6.79	21 30.6	30	20 43 24.22	12.574	18 21 48.6	40.50	22 8.7
31	18 8 4.83	+13.027	−22 1 15.3	− 5.23	21 31.9	31	20 48 25.55	+12.536	−18 5 21.0	+41.80	22 9.8
32	18 13 17.67	+13.042	−22 3 2.1	− 3.67	21 33.1	32	20 53 25.96	+12.497	−17 48 22.4	+43.08	22 10.8

Day of the Month.	1st.	6th.	11th.	16th.	21st.	26th.	31st.	Day of the Month.	5th.	10th.	15th.	20th.	25th.
	″	″	″	″	″	″	″		″	″	″	″	″
Semidiameter. . . .	8.98	8.66	8.36	8.08	7.83	7.60	7.39	Semidiameter	7.19	7.01	6.84	6.67	6.52
Horizontal Parallax.	9.25	8.92	8.61	8.33	8.07	7.83	7.61	Horizontal Parallax	7.41	7.22	7.04	6.87	6.71

Note.—The sign + indicates north declinations; the sign − indicates south declinations.

GREENWICH MEAN TIME.

MARCH.						APRIL.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.
	Noon.	*Noon.*	*Noon.*	*Noon.*			*Noon.*	*Noon.*	*Noon.*	*Noon.*	
	h m s	s	° ′ ″	″	h m		h m s	s	° ′ ″	″	h m
1	20 43 24.22	+12.574	−18 21 48.6	+40.50	22 8.7	1	23 11 54.86	+11.456	−6 37 44.6	+68.58	22 34.6
2	20 48 25.55	12.536	18 5 21.0	41.80	22 9.8	2	23 16 29.53	11.434	6 10 13.2	69.03	22 35.2
3	20 53 25.96	12.497	17 48 22.4	43.08	22 10.8	3	23 21 3.68	11.413	5 42 31.2	69.46	22 35.9
4	20 58 25.43	12.458	17 30 53.2	44.34	22 11.9	4	23 25 37.34	11.394	5 14 39.4	69.85	22 36.5
5	21 3 23.95	12.419	17 12 54.1	45.58	22 12.9	5	23 30 10.56	11.375	4 46 38.3	70.22	22 37.1
6	21 8 21.52	+12.379	−16 54 25.6	+46.79	22 13.9	6	23 34 43.36	+11.358	−4 18 28.8	+70.56	22 37.7
7	21 13 18.13	12.339	16 35 28.3	47.98	22 14.9	7	23 39 15.78	11.344	3 50 11.5	70.87	22 38.3
8	21 18 13.78	12.299	16 16 2.8	49.14	22 15.9	8	23 43 47.85	11.330	3 21 47.1	71.15	22 38.9
9	21 23 8.46	12.258	15 56 9.8	50.28	22 16.9	9	23 48 19.62	11.318	2 53 16.3	71.41	22 39.5
10	21 28 2.17	12.218	15 35 49.8	51.38	22 17.8	10	23 52 51.13	11.307	2 24 39.7	71.63	22 40.1
11	21 32 54.90	+12.177	−15 15 3.6	+52.46	22 18.7	11	23 57 22.39	+11.298	−1 55 58.1	+71.83	22 40.6
12	21 37 46.66	12.137	14 53 51.7	53.52	22 19.6	12	0 1 53.46	11.291	1 27 12.2	71.99	22 41.2
13	21 42 37.45	12.096	14 32 14.9	54.55	22 20.5	13	0 6 24.36	11.285	0 58 22.7	72.13	22 41.8
14	21 47 27.28	12.056	14 10 13.7	55.55	22 21.4	14	0 10 55.14	11.280	0 29 30.2	72.24	22 42.4
15	21 52 16.15	12.017	13 47 48.8	56.52	22 22.2	15	0 15 25.83	11.277	−0 0 35.5	72.31	22 42.9
16	21 57 4.07	+11.977	−13 25 1.0	+57.46	22 23.0	16	0 19 56.47	+11.276	+0 28 20.7	+72.36	22 43.4
17	22 1 51.05	11.938	13 1 51.0	58.37	22 23.8	17	0 24 27.10	11.276	0 57 17.8	72.38	22 44.0
18	22 6 37.10	11.900	12 38 19.4	59.25	22 24.7	18	0 28 57.75	11.278	1 26 14.9	72.37	22 44.6
19	22 11 22.24	11.862	12 14 27.0	60.11	22 25.5	19	0 33 28.45	11.281	1 55 11.4	72.33	22 45.2
20	22 16 6.48	11.825	11 50 14.3	60.94	22 26.3	20	0 37 59.25	11.286	2 24 6.6	72.26	22 45.8
21	22 20 49.83	+11.789	−11 25 42.2	+61.73	22 27.1	21	0 42 30.18	+11.292	+2 52 59.8	+72.16	22 46.3
22	22 25 32.31	11.753	11 0 51.4	62.50	22 27.8	22	0 47 1.28	11.300	3 21 50.3	72.04	22 46.9
23	22 30 13.95	11.718	10 35 42.5	63.24	22 28.5	23	0 51 32.59	11.310	3 50 37.4	71.88	22 47.5
24	22 34 54.77	11.684	10 10 16.2	63.95	22 29.3	24	0 56 4.15	11.321	4 19 20.3	71.69	22 48.1
25	22 39 34.79	11.651	9 44 33.3	64.63	22 30.0	25	1 0 36.00	11.334	4 47 58.4	71.48	22 48.7
26	22 44 14.03	+11.619	− 9 18 34.5	+65.28	22 30.7	26	1 5 8.17	+11.348	+5 16 31.1	+71.24	22 49.3
27	22 48 52.52	11.589	8 52 20.4	65.90	22 31.4	27	1 9 40.70	11.363	5 44 57.7	70.97	22 49.9
28	22 53 30.29	11.560	8 25 51.8	66.49	22 32.0	28	1 14 13.64	11.381	6 13 17.4	70.67	22 50.5
29	22 58 7.38	11.532	7 59 9.2	67.05	22 32.7	29	1 18 47.02	11.401	6 41 29.5	70.34	22 51.1
30	23 2 43.81	11.505	7 32 13.3	67.59	22 33.4	30	1 23 20.89	11.423	7 9 33.5	69.99	22 51.7
31	23 7 19.63	+11.480	− 7 5 4.9	+68.10	22 34.0	31	1 27 55.29	+11.445	+7 37 28.6	+69.60	22 52.4
32	23 11 54.86	+11.456	− 6 37 44.6	+68.58	22 34.6	32	1 32 30.24	+11.468	+8 5 14.1	+69.18	22 53.0

Day of the Month.	1st.	6th.	11th.	16th.	21st.	26th.	31st.	Day of the Month.	5th.	10th.	15th.	20th.	25th.	30th.
	″	″	″	″	″	″	″		″	″	″	″	″	″
Semidiameter	6.38	6.25	6.13	6.02	5.92	5.82	5.72	Semidiameter	5.63	5.55	5.48	5.41	5.34	5.28
Horizontal Parallax.	6.57	6.44	6.32	6.20	6.09	5.99	5.89	Horizontal Parallax . .	5.80	5.72	5.64	5.57	5.50	5.44

Note.—The sign + prefixed to the hourly change of declination indicates that south declinations are decreasing, north declinations increasing.

VENUS, 1912.

GREENWICH MEAN TIME.

MAY.						JUNE.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.
	Noon.	*Noon.*	*Noon.*	*Noon.*			*Noon.*	*Noon.*	*Noon.*	*Noon.*	
	h m s	s	° ′ ″	″	h m		h m s	s	° ′ ″	″	h m
1	1 27 55.29	+11.445	+ 7 37 28.6	+69.60	22 52.4	1	3 56 41.15	+12.669	+19 44 25.6	+42.85	23 19.3
2	1 32 30.24	11.468	8 5 14.1	69.18	22 53.0	2	4 1 45.76	12.715	20 1 18.2	41.52	23 20.5
3	1 37 5.78	11.494	8 32 49.3	68.74	22 53.7	3	4 6 51.46	12.761	20 17 38.6	40.16	23 21.7
4	1 41 41.96	11.521	9 0 13.5	68.27	22 54.4	4	4 11 58.24	12.805	20 33 26.1	38.78	23 22.9
5	1 46 18.81	11.550	9 27 26.1	67.77	22 55.0	5	4 17 6.09	12.849	20 48 40.1	37.38	23 24.1
6	1 50 56.37	+11.580	+ 9 54 26.3	+67.24	22 55.7	6	4 22 14.97	+12.892	+21 3 20.1	+35.95	23 25.3
7	1 55 34.66	11.611	10 21 13.5	66.68	22 56.4	7	4 27 24.88	12.934	21 17 25.3	34.49	23 26.5
8	2 0 13.72	11.644	10 47 46.8	66.09	22 57.1	8	4 32 35.79	12.975	21 30 55.3	33.01	23 27.8
9	2 4 53.58	11.678	11 14 5.5	65.47	22 57.9	9	4 37 47.67	13.015	21 43 49.5	31.51	23 29.1
10	2 9 34.27	11.713	11 40 9.0	64.82	22 58.7	10	4 43 0.50	13.053	21 56 7.3	29.98	23 30.4
11	2 14 15.82	+11.750	+12 5 56.5	+64.13	22 59.4	11	4 48 14.23	+13.091	+22 7 48.2	+28.43	23 31.7
12	2 18 58.25	11.787	12 31 27.3	63.42	23 0.2	12	4 53 28.84	13.126	22 18 51.6	26.86	23 33.0
13	2 23 41.59	11.825	12 56 40.6	62.68	23 1.0	13	4 58 44.29	13.160	22 29 17.2	25.27	23 34.3
14	2 28 25.88	11.865	13 21 35.8	61.91	23 1.8	14	5 4 0.53	13.193	22 39 4.4	23.66	23 35.6
15	2 33 11.12	11.905	13 46 12.0	61.11	23 2.6	15	5 9 17.53	13.223	22 48 12.7	22.03	23 37.0
16	2 37 57.34	+11.946	+14 10 28.6	+60.27	23 3.4	16	5 14 35.24	+13.252	+22 56 41.7	+20.39	23 38.4
17	2 42 44.55	11.988	14 34 24.7	59.40	23 4.3	17	5 19 53.60	13.277	23 4 31.0	18.72	23 39.8
18	2 47 32.78	12.031	14 57 59.6	58.50	23 5.2	18	5 25 12.57	13.302	23 11 40.3	17.05	23 41.1
19	2 52 22.04	12.074	15 21 12.6	57.58	23 6.1	19	5 30 32.11	13.325	23 18 9.2	15.36	23 42.5
20	2 57 12.34	12.118	15 44 3.0	56.62	23 7.0	20	5 35 52.16	13.345	23 23 57.4	13.65	23 44.0
21	3 2 3.70	+12.162	+16 6 30.1	+55.63	23 8.0	21	5 41 12.66	+13.363	+23 29 4.6	+11.94	23 45.4
22	3 6 56.14	12.207	16 28 33.2	54.62	23 9.0	22	5 46 33.57	13.378	23 33 30.6	10.22	23 46.8
23	3 11 49.66	12.252	16 50 11.5	53.57	23 9.9	23	5 51 54.82	13.392	23 37 15.1	8.49	23 48.2
24	3 16 44.27	12.298	17 11 24.2	52.49	23 10.9	24	5 57 16.38	13.403	23 40 17.9	6.75	23 49.6
25	3 21 39.98	12.344	17 32 10.7	51.38	23 11.9	25	6 2 38.18	13.412	23 42 38.9	5.00	23 51.0
26	3 26 36.80	+12.391	+17 52 30.3	+50.25	23 12.9	26	6 8 0.16	+13.419	+23 44 17.9	+ 3.25	23 52.5
27	3 31 34.74	12.438	18 12 22.4	49.09	23 13.9	27	6 13 22.28	13.423	23 45 14.9	+ 1.50	23 53.9
28	3 36 33.79	12.485	18 31 46.2	47.89	23 14.9	28	6 18 44.47	13.425	23 45 29.7	− 0.26	23 55.3
29	3 41 33.96	12.531	18 50 41.1	46.67	23 16.0	29	6 24 6.69	13.425	23 45 2.3	2.02	23 56.7
30	3 46 35.24	12.577	19 9 6.4	45.43	23 17.1	30	6 29 28.86	13.423	23 43 52.6	3.78	23 58.2
31	3 51 37.64	+12.623	+19 27 1.5	+44.15	23 18.2	31	6 34 50.95	+13.418	+23 42 0.7	− 5.54	23 59.6
32	3 56 41.15	+12.669	+19 44 25.6	+42.85	23 19.3	32	6 40 12.89	+13.410	+23 39 26.6	− 7.30	. . .

Day of the Month.	5th.	10th.	15th.	20th.	25th.	30th	Day of the Month.	4th.	9th.	14th.	19th.	24th.	29th.
	″	″	″	″	″	″		″	″	″	″	″	″
Semidiameter	5.23	5.18	5.14	5.10	5.06	5.03	Semidiameter	5.00	4.97	4.95	4.94	4.93	4.92
Horizontal Parallax . .	5.39	5.34	5.29	5.25	5.21	5.18	Horizontal Parallax . .	5.15	5.12	5.10	5.09	5.08	5.07

Note.—The sign + indicates north declinations; the sign − indicates south declinations.

GREENWICH MEAN TIME.

JULY.						AUGUST.					
Day of Month.	Apparent Right Ascension. Noon.	Var. of R. A. for 1 Hour. Noon.	Apparent Declination. Noon.	Var. of Decl. for 1 Hour. Noon.	Meridian Passage.	Day of Month.	Apparent Right Ascension. Noon.	Var. of R. A. for 1 Hour. Noon.	Apparent Declination. Noon.	Var. of Decl. for 1 Hour. Noon.	Meridian Passage.
	h m s	s	° ′ ″	″	h m		h m s	s	° ′ ″	″	h m
1	6 34 50.95	+13.418	+23 42 0.7	− 5.54	23 59.6	1	9 16 3.78	+12.359	+17 17 25.8	−53.46	0 37.2
2	6 40 12.89	13.410	23 39 26.6	7.30	. . . .	2	9 20 59.83	12.311	16 55 48.5	54.64	0 38.2
3	6 45 34.63	13.400	23 36 10.3	9.05	0 1.0	3	9 25 54.73	12.264	16 33 43.3	55.79	0 39.2
4	6 50 56.10	13.389	23 32 11.9	10.80	0 2.4	4	9 30 48.50	12.217	16 11 10.8	56.91	0 40.2
5	6 56 17.26	13.375	23 27 31.7	12.54	0 3.8	5	9 35 41.14	12.170	15 48 11.7	58.00	0 41.1
6	7 1 38.05	+13.358	+23 22 9.7	−14.28	0 5.2	6	9 40 32.67	+12.124	+15 24 46.7	−59.07	0 42.0
7	7 6 58.43	13.340	23 16 6.2	16.01	0 6.6	7	9 45 23.09	12.078	15 0 56.5	60.11	0 42.9
8	7 12 18.32	13.319	23 9 21.3	17.73	0 8.0	8	9 50 12.42	12.033	14 36 41.8	61.12	0 43.8
9	7 17 37.69	13.296	23 1 55.2	19.44	0 9.4	9	9 55 0.67	11.989	14 12 3.3	62.09	0 44.6
10	7 22 56.48	13.271	22 53 48.2	21.14	0 10.8	10	9 59 47.87	11.945	13 47 1.8	63.03	0 45.4
11	7 28 14.65	+13.244	+22 45 0.7	−22.82	0 12.2	11	10 4 34.03	+11.902	+13 21 37.9	−63.95	0 46.2
12	7 33 32.14	13.214	22 35 32.9	24.49	0 13.6	12	10 9 19.16	11.860	12 55 52.5	64.83	0 47.0
13	7 38 48.91	13.183	22 25 25.3	26.15	0 14.9	13	10 14 3.28	11.819	12 29 46.2	65.68	0 47.8
14	7 44 4.91	13.150	22 14 38.1	27.79	0 16.2	14	10 18 46.43	11.779	12 3 19.9	66.50	0 48.6
15	7 49 20.09	13.115	22 3 11.8	29.40	0 17.5	15	10 23 28.62	11.739	11 36 34.3	67.29	0 49.4
16	7 54 34.42	+13.078	+21 51 6.9	−31.00	0 18.8	16	10 28 9.87	+11.700	+11 9 30.0	−68.05	0 50.1
17	7 59 47.85	13.040	21 38 23.8	32.58	0 20.1	17	10 32 50.21	11.662	10 42 8.0	68.77	0 50.8
18	8 5 0.35	13.000	21 25 3.1	34.14	0 21.4	18	10 37 29.67	11.626	10 14 28.9	69.47	0 51.6
19	8 10 11.88	12.960	21 11 5.2	35.68	0 22.6	19	10 42 8.27	11.592	9 46 33.4	70.14	0 52.3
20	8 15 22.42	12.919	20 56 30.6	37.20	0 23.8	20	10 46 46.05	11.558	9 18 22.4	70.77	0 53.0
21	8 20 31.94	+12.876	+20 41 19.8	−38.70	0 25.0	21	10 51 23.05	+11.526	+ 8 49 56.5	−71.38	0 53.7
22	8 25 40.41	12.831	20 25 33.4	40.17	0 26.2	22	10 55 59.29	11.495	8 21 16.4	71.95	0 54.3
23	8 30 47.80	12.786	20 9 12.1	41.61	0 27.4	23	11 0 34.81	11.466	7 52 22.9	72.50	0 54.9
24	8 35 54.10	12.740	19 52 16.3	43.03	0 28.6	24	11 5 9.64	11.438	7 23 16.7	73.01	0 55.6
25	8 40 59.29	12.693	19 34 46.8	44.42	0 29.7	25	11 9 43.83	11.412	6 53 58.5	73.50	0 56.2
26	8 46 3.35	+12.646	+19 16 44.1	−45.79	0 30.8	26	11 14 17.41	+11.388	+ 6 24 29.1	−73.95	0 56.8
27	8 51 6.28	12.599	18 58 8.8	47.14	0 31.9	27	11 18 50.41	11.365	5 54 49.1	74.37	0 57.4
28	8 56 8.08	12.551	18 39 1.5	48.46	0 33.0	28	11 23 22.89	11.344	5 24 59.4	74.76	0 58.0
29	9 1 8.74	12.503	18 19 22.9	49.75	0 34.1	29	11 27 54.88	11.324	4 55 0.6	75.12	0 58.6
30	9 6 8.24	12.455	17 59 13.6	51.02	0 35.2	30	11 32 26.42	11.306	4 24 53.3	75.46	0 59.2
31	9 11 6.59	+12.407	+17 38 34.4	−52.25	0 36.2	31	11 36 57.55	+11.290	+ 3 54 38.3	−75.77	0 59.8
32	9 16 3.78	+12.359	+17 17 25.8	−53.46	0 37.2	32	11 41 28.32	+11.275	+ 3 24 16.3	−76.05	1 0.3

Day of the Month.	4th.	9th.	14th.	19th.	24th.	29th.
	″	″	″	″	″	″
Semidiameter . . .	4.92	4.92	4.93	4.94	4.95	4.97
Horizontal Parallax.	5.07	5.07	5.08	5.09	5.10	5.12

Day of the Month.	3d.	8th.	13th.	18th.	23d.	28th.
	″	″	″	″	″	″
Semidiameter . . .	5.00	5.03	5.06	5.10	5.14	5.18
Horizontal Parallax.	5.15	5.18	5.21	5.25	5.29	5.33

NOTE.—The sign − prefixed to the hourly change of declination indicates that north declinations are decreasing.

VENUS, 1912.

GREENWICH MEAN TIME.

SEPTEMBER.						OCTOBER.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.
	Noon.	*Noon.*	*Noon.*	*Noon.*			*Noon.*	*Noon.*	*Noon.*	*Noon.*	
	h m s	s	° ′ ″	″	h m		h m s	s	° ′ ″	″	h m
1	11 41 28.32	+11.275	+ 3 24 16.3	−76.05	1 0.3	1	13 57 29.44	+11.650	−11 40 50.2	−70.17	1 18.1
2	11 45 58.76	11.262	2 53 48.1	76.30	1 0.9	2	14 2 9.48	11.688	12 8 46.3	69.50	1 18.8
3	11 50 28.93	11.252	2 23 14.3	76.51	1 1.5	3	14 6 50.44	11.727	12 36 25.7	68.79	1 19.5
4	11 54 58.86	11.243	1 52 35.6	76.70	1 2.1	4	14 11 32.37	11.768	13 3 47.8	68.05	1 20.3
5	11 59 28.60	11.236	1 21 52.8	76.86	1 2.6	5	14 16 15.29	11.810	13 30 51.7	67.27	1 21.1
6	12 3 58.20	+11.231	+ 0 51 6.5	−76.99	1 3.1	6	14 20 59.23	+11.853	−13 57 36.7	−66.47	1 21.9
7	12 8 27.69	11.227	+ 0 20 17.5	77.09	1 3.7	7	14 25 44.22	11.897	14 24 1.9	65.63	1 22.7
8	12 12 57.10	11.225	− 0 10 33.5	77.15	1 4.3	8	14 30 30.28	11.942	14 50 6.6	64.75	1 23.5
9	12 17 26.48	11.225	0 41 25.8	77.19	1 4.8	9	14 35 17.44	11.989	15 15 50.0	63.85	1 24.4
10	12 21 55.88	11.226	1 12 18.6	77.20	1 5.3	10	14 40 5.72	12.036	15 41 11.3	62.91	1 25.3
11	12 26 25.34	+11.230	− 1 43 11.2	−77.18	1 5.9	11	14 44 55.13	+12.083	−16 6 9.7	−61.94	1 26.1
12	12 30 54.90	11.235	2 14 2.8	77.12	1 6.5	12	14 49 45.70	12.131	16 30 44.3	60.93	1 27.0
13	12 35 24.61	11.242	2 44 52.7	77.03	1 7.0	13	14 54 37.43	12.180	16 54 54.4	59.89	1 27.9
14	12 39 54.49	11.250	3 15 40.2	76.91	1 7.5	14	14 59 30.34	12.229	17 18 39.1	58.82	1 28.8
15	12 44 24.59	11.259	3 46 24.5	76.76	1 8.1	15	15 4 24.44	12.279	17 41 57.7	57.72	1 29.8
16	12 48 54.95	+11.271	− 4 17 4.7	−76.58	1 8.7	16	15 9 19.73	+12.329	−18 4 49.4	−56.58	1 30.8
17	12 53 25.62	11.285	4 47 40.3	76.37	1 9.2	17	15 14 16.23	12.379	18 27 13.5	55.41	1 31.8
18	12 57 56.63	11.300	5 18 10.5	76.13	1 9.8	18	15 19 13.94	12.429	18 49 9.1	54.21	1 32.8
19	13 2 28.02	11.317	5 48 34.5	75.86	1 10.4	19	15 24 12.85	12.479	19 10 35.4	52.97	1 33.9
20	13 6 59.83	11.335	6 18 51.5	75.55	1 11.0	20	15 29 12.97	12.530	19 31 31.7	51.71	1 35.0
21	13 11 32.11	+11.355	− 6 49 0.9	−75.22	1 11.6	21	15 34 14.30	+12.580	−19 51 57.3	−50.41	1 36.0
22	13 16 4.90	11.378	7 19 1.9	74.85	1 12.2	22	15 39 16.83	12.630	20 11 51.4	49.09	1 37.1
23	13 20 38.25	11.402	7 48 53.7	74.46	1 12.8	23	15 44 20.56	12.680	20 31 13.3	47.73	1 38.3
24	13 25 12.18	11.427	8 18 35.7	74.03	1 13.4	24	15 49 25.48	12.730	20 50 2.3	46.34	1 39.5
25	13 29 46.73	11.453	8 48 7.0	73.57	1 14.0	25	15 54 31.58	12.779	21 8 17.6	44.92	1 40.6
26	13 34 21.95	+11.482	− 9 17 26.9	−73.08	1 14.6	26	15 59 38.84	+12.827	−21 25 58.6	−43.48	1 41.8
27	13 38 57.88	11.513	9 46 34.8	72.56	1 15.3	27	16 4 47.25	12.874	21 43 4.6	42.01	1 43.0
28	13 43 34.56	11.545	10 15 29.8	72.01	1 16.0	28	16 9 56.79	12.921	21 59 35.0	40.51	1 44.2
29	13 48 12.02	11.578	10 44 11.2	71.43	1 16.7	29	16 15 7.43	12.966	22 15 29.0	38.98	1 45.4
30	13 52 50.30	11.613	11 12 38.2	70.82	1 17.4	30	16 20 19.16	13.011	22 30 46.0	37.43	1 46.7
31	13 57 29.44	+11.650	−11 40 50.2	−70.17	1 18.1	31	16 25 31.95	+13.054	−22 45 25.4	−35.85	1 48.0
32	14 2 9.48	+11.688	−12 8 46.3	−69.50	1 18.8	32	16 30 45.77	+13.096	−22 59 26.6	−34.25	1 49.3

Day of the Month.	2d.	7th.	12th.	17th.	22d.	27th.	Day of the Month.	2d.	7th.	12th.	17th.	22d.	27th.
	″	″	″	″	″	″		″	″	″	″	″	″
Semidiameter	5.23	5.28	5.34	5.41	5.48	5.55	Semidiameter	5.63	5.71	5.80	5.90	6.00	6.11
Horizontal Parallax . . .	5.38	5.44	5.50	5.57	5.64	5.71	Horizontal Parallax . . .	5.79	5.88	5.97	6.07	6.18	6.29

NOTE.—The sign + indicates north declinations; the sign − indicates south declinations.

GREENWICH MEAN TIME.

NOVEMBER.						DECEMBER.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
	h m s	s	° ′ ″	″	h m		h m s	s	° ′ ″	″	h m
1	16 30 45.77	+13.096	−22 59 26.6	−34.25	1 49.3	1	19 11 16.39	+13.246	−24 30 26.5	+19.97	2 31.4
2	16 36 0.58	13.137	23 12 49.0	32.62	1 50.5	2	19 16 33.86	13.209	24 22 5.8	21.75	2 32.8
3	16 41 16.36	13.177	23 25 32.0	30.96	1 51.8	3	19 21 50.40	13.169	24 13 2.4	23.52	2 34.2
4	16 46 33.05	13.214	23 37 35.1	29.29	1 53.2	4	19 27 5.96	13.127	24 3 17.0	25.27	2 35.5
5	16 51 50.62	13.250	23 48 57.7	27.59	1 54.6	5	19 32 20.48	13.083	23 52 49.8	27.00	2 36.8
6	16 57 9.02	+13.283	−23 59 39.3	−25.88	1 55.9	6	19 37 33.92	+13.036	−23 41 41.2	+28.71	2 38.1
7	17 2 28.20	13.315	24 9 39.5	24.14	1 57.3	7	19 42 46.21	12.987	23 29 51.7	30.40	2 39.3
8	17 7 48.11	13.344	24 18 57.8	22.38	1 58.7	8	19 47 57.31	12.937	23 17 21.9	32.07	2 40.5
9	17 13 8.69	13.370	24 27 33.6	20.61	2 0.1	9	19 53 7.16	12.884	23 4 12.4	33.72	2 41.7
10	17 18 29.88	13.394	24 35 26.7	18.82	2 1.5	10	19 58 15.72	12.829	22 50 23.7	35.34	2 43.0
11	17 23 51.62	+13.416	−24 42 36.6	−17.01	2 2.9	11	20 3 22.94	+12.772	−22 35 56.4	+36.93	2 44.2
12	17 29 13.84	13.435	24 49 3.0	15.19	2 4.4	12	20 8 28.78	12.714	22 20 51.1	38.50	2 45.3
13	17 34 36.48	13.451	24 54 45.6	13.36	2 5.9	13	20 13 33.20	12.654	22 5 8.4	40.05	2 46.4
14	17 39 59.48	13.464	24 59 44.2	11.52	2 7.3	14	20 18 36.16	12.592	21 48 49.1	41.56	2 47.5
15	17 45 22.75	13.474	25 3 58.4	9.67	2 8.7	15	20 23 37.63	12.530	21 31 53.8	43.05	2 48.6
16	17 50 46.25	+13.482	−25 7 28.1	− 7.81	2 10.1	16	20 28 37.59	+12.466	−21 14 23.2	+44.50	2 49.7
17	17 56 9.89	13.487	25 10 13.2	5.95	2 11.6	17	20 33 36.00	12.401	20 56 17.9	45.93	2 50.7
18	18 1 33.60	13.488	25 12 13.5	4.08	2 13.1	18	20 38 32.83	12.335	20 37 38.8	47.32	2 51.7
19	18 6 57.31	13.487	25 13 28.9	2.20	2 14.6	19	20 43 28.06	12.268	20 18 26.6	48.69	2 52.7
20	18 12 20.95	13.482	25 13 59.3	− 0.33	2 16.0	20	20 48 21.67	12.200	19 58 42.1	50.02	2 53.7
21	18 17 44.45	+13.475	−25 13 44.7	+ 1.54	2 17.4	21	20 53 13.64	+12.131	−19 38 25.9	+51.32	2 54.6
22	18 23 7.73	13.464	25 12 45.2	3.41	2 18.8	22	20 58 3.97	12.062	19 17 38.8	52.59	2 55.5
23	18 28 30.73	13.451	25 11 0.8	5.28	2 20.2	23	21 2 52.63	11.993	18 56 21.7	53.83	2 56.3
24	18 33 53.37	13.435	25 8 31.6	7.15	2 21.7	24	21 7 39.63	11.924	18 34 35.3	55.03	2 57.1
25	18 39 15.59	13.416	25 5 17.7	9.01	2 23.1	25	21 12 24.96	11.855	18 12 20.3	56.21	2 57.9
26	18 44 37.32	+13.394	−25 1 19.3	+10.86	2 24.5	26	21 17 8.62	+11.785	−17 49 37.6	+57.35	2 58.7
27	18 49 58.49	13.369	24 56 36.5	12.70	2 25.9	27	21 21 50.61	11.715	17 26 27.9	58.46	2 59.5
28	18 55 19.04	13.342	24 51 9.5	14.54	2 27.4	28	21 26 30.93	11.646	17 2 51.9	59.53	3 0.2
29	19 0 38.92	13.312	24 44 58.6	16.36	2 28.8	29	21 31 9.59	11.577	16 38 50.5	60.57	3 0.9
30	19 5 58.06	13.280	24 38 4.2	18.17	2 30.1	30	21 35 46.60	11.508	16 14 24.4	61.59	3 1.6
31	19 11 16.39	+13.246	−24 30 26.5	+19.97	2 31.4	31	21 40 21.96	+11.439	−15 49 34.4	+62.57	3 2.3
32	19 16 33.86	+13.209	−24 22 5.8	+21.75	2 32.8	32	21 44 55.68	+11.371	−15 24 21.2	+63.52	3 2.9

Day of the Month.	1st.	6th.	11th.	16th.	21st.	26th.
	″	″	″	″	″	″
Semidiameter.	6.22	6.35	6.49	6.63	6.78	6.94
Horizontal Parallax . . .	6.41	6.54	6.68	6.83	6.98	7.15

Day of the Month.	1st.	6th.	11th.	16th.	21st.	26th.	31st.
	″	″	″	″	″	″	″
Semidiameter . . .	7.12	7.31	7.52	7.73	7.96	8.21	8.49
Horizontal Parallax	7.33	7.53	7.73	7.96	8.20	8.46	8.75

Note.—The sign − prefixed to the hourly change of declination indicates that south declinations are increasing; the sign + indicates that south declinations are decreasing.

MARS, 1912.

GREENWICH MEAN TIME.

JANUARY.						FEBRUARY.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.
	Noon.	*Noon.*	*Noon.*	*Noon.*			*Noon.*	*Noon.*	*Noon.*	*Noon.*	
	h m s	s	° ′ ″	″	h m		h m s	s	° ′ ″	″	h m
1	3 25 37.21	+0.354	+21 0 37.8	+2.64	8 45.1	1	3 51 25.54	+3.497	+22 28 24.2	+ 9.98	7 9.3
2	3 25 47.28	0.485	21 1 45.6	3.01	8 41.4	2	3 52 50.30	3.567	22 32 24.6	10.05	7 6.8
3	3 26 0.48	0.615	21 3 2.1	3.37	8 37.7	3	3 54 16.73	3.636	22 36 26.4	10.10	7 4.3
4	3 26 16.77	0.742	21 4 27.1	3.73	8 34.0	4	3 55 44.80	3.703	22 40 29.6	10.15	7 1.9
5	3 26 36.09	0.867	21 6 0.5	4.06	8 30.4	5	3 57 14.47	3.769	22 44 33.9	10.19	6 59.4
6	3 26 58.37	+0.990	+21 7 41.9	+4.39	8 26.9	6	3 58 45.72	+3.834	+22 48 38.9	+10.22	6 57.0
7	3 27 23.56	1.111	21 9 31.3	4.72	8 23.4	7	4 0 18.51	3.898	22 52 44.4	10.24	6 54.6
8	3 27 51.62	1.229	21 11 28.6	5.04	8 19.9	8	4 1 52.82	3.960	22 56 50.3	10.25	6 52.3
9	3 28 22.50	1.345	21 13 33.6	5.36	8 16.5	9	4 3 28.60	4.021	23 0 56.4	10.25	6 49.9
10	3 28 56.16	1.459	21 15 46.0	5.67	8 13.2	10	4 5 5.84	4.082	23 5 2.4	10.25	6 47.6
11	3 29 32.55	+1.571	+21 18 5.7	+5.97	8 9.9	11	4 6 44.51	+4.141	+23 9 8.2	+10.23	6 45.3
12	3 30 11.61	1.682	21 20 32.5	6.26	8 6.6	12	4 8 24.58	4.199	23 13 13.5	10.20	6 43.1
13	3 30 53.30	1.792	21 23 6.1	6.54	8 3.4	13	4 10 6.03	4.256	23 17 18.1	10.17	6 40.8
14	3 31 37.60	1.900	21 25 46.4	6.81	8 0.2	14	4 11 48.83	4.312	23 21 21.8	10.13	6 38.6
15	3 32 24.45	2.005	21 28 33.2	7.08	7 57.1	15	4 13 32.97	4.367	23 25 24.3	10.08	6 36.4
16	3 33 13.79	+2.108	+21 31 26.3	+7.34	7 54.0	16	4 15 18.40	+4.420	+23 29 25.5	+10.02	6 34.2
17	3 34 5.58	2.210	21 34 25.5	7.58	7 50.9	17	4 17 5.11	4.472	23 33 25.2	9.95	6 32.1
18	3 34 59.79	2.309	21 37 30.4	7.82	7 47.9	18	4 18 53.06	4.524	23 37 23.2	9.87	6 29.9
19	3 35 56.36	2.406	21 40 40.9	8.05	7 44.9	19	4 20 42.24	4.574	23 41 19.2	9.79	6 27.8
20	3 36 55.24	2.501	21 43 56.7	8.27	7 41.9	20	4 22 32.61	4.624	23 45 13.0	9.70	6 25.7
21	3 37 56.40	+2.595	+21 47 17.6	+8.48	7 39.0	21	4 24 24.16	+4.672	+23 49 4.6	+ 9.60	6 23.6
22	3 38 59.78	2.687	21 50 43.3	8.67	7 36.2	22	4 26 16.85	4.720	23 52 53.6	9.49	6 21.5
23	3 40 5.33	2.777	21 54 13.5	8.85	7 33.3	23	4 28 10.66	4.765	23 56 39.8	9.37	6 19.5
24	3 41 13.00	2.864	21 57 48.0	9.02	7 30.5	24	4 30 5.56	4.810	24 0 23.1	9.24	6 17.5
25	3 42 22.76	2.950	22 1 26.5	9.18	7 27.8	25	4 32 1.52	4.854	24 4 3.2	9.10	6 15.5
26	3 43 34.57	+3.034	+22 5 8.7	+9.33	7 25.0	26	4 33 58.52	+4.897	+24 7 40.0	+ 8.96	6 13.5
27	3 44 48.37	3.116	22 8 54.4	9.47	7 22.3	27	4 35 56.55	4.939	24 11 13.3	8.81	6 11.6
28	3 46 4.10	3.196	22 12 43.2	9.59	7 19.7	28	4 37 55.57	4.980	24 14 42.9	8.65	6 9.6
29	3 47 21.74	3.274	22 16 34.8	9.71	7 17.0	29	4 39 55.54	5.019	24 18 8.5	8.48	6 7.7
30	3 48 41.22	3.350	22 20 29.0	9.81	7 14.4	30	4 41 56.43	5.057	24 21 30.0	8.31	6 5.8
31	3 50 2.50	+3.425	+22 24 25.6	+9.90	7 11.9	31	4 43 58.24	+5.095	+24 24 47.3	+ 8.13	6 3.9
32	3 51 25.54	+3.497	+22 28 24.2	+9.98	7 9.3	32	4 46 0.94	+5.132	+24 28 0.2	+ 7.94	6 2.0

Day of the Month.	0	5th.	10th.	15th.	20th.	25th.	30th.	Day of the Month.	4th.	9th.	14th.	19th.	24th.	29th.
	″	″	″	″	″	″	″		″	″	″	″	″	″
Semidiameter	7.35	6.97	6.60	6.25	5.93	5.63	5.35	Semidiameter	5.09	4.86	4.64	4.43	4.25	4.08
Horizontal Parallax.	12.79	12.13	11.49	10.89	10.33	9.80	9.32	Horizontal Parallax. . .	8.87	8.46	8.07	7.72	7.40	7.10

NOTE.—The sign + indicates north declinations; the sign — indicates south declinations.

MARS, 1912.

GREENWICH MEAN TIME.

MARCH.						APRIL.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.
	Noon.	*Noon.*	*Noon.*	*Noon.*			*Noon.*	*Noon.*	*Noon.*	*Noon.*	
	h m s	s	° ′ ″	″	h m		h m s	s	° ′ ″	″	h m
1	4 41 56.43	+5.057	+24 21 30.0	+8.31	6 5.8	1	5 50 33.23	+5.902	+25 19 21.5	+ 0.25	5 12.3
2	4 43 58.24	5.095	24 24 47.3	8.13	6 3.9	2	5 52 55.06	5.918	25 19 23.3	− 0.08	5 10.7
3	4 46 0.94	5.132	24 28 0.2	7.94	6 2.0	3	5 55 17.28	5.934	25 19 17.4	0.41	5 9.2
4	4 48 4.52	5.167	24 31 8.6	7.75	6 0.1	4	5 57 39.88	5.950	25 19 3.5	0.75	5 7.6
5	4 50 8.94	5.202	24 34 12.2	7.55	5 58.2	5	6 0 2.85	5.965	25 18 41.6	1.09	5 6.0
6	4 52 14.20	+5.236	+24 37 10.9	+7.35	5 56.4	6	6 2 26.17	+5.980	+25 18 11.6	− 1.43	5 4.5
7	4 54 20.28	5.270	24 40 4.7	7.13	5 54.6	7	6 4 49.84	5.994	25 17 33.4	1.77	5 3.0
8	4 56 27.16	5.303	24 42 53.4	6.91	5 52.7	8	6 7 13.85	6.007	25 16 47.1	2.11	5 1.4
9	4 58 34.83	5.336	24 45 36.8	6.69	5 50.9	9	6 9 38.18	6.020	25 15 52.6	2.45	4 59.9
10	5 0 43.26	5.368	24 48 14.8	6.46	5 49.1	10	6 12 2.82	6.033	25 14 49.8	2.80	4 58.4
11	5 2 52.46	+5.400	+24 50 47.3	+6.23	5 47.3	11	6 14 27.77	+6.046	+25 13 38.6	− 3.15	4 56.8
12	5 5 2.41	5.430	24 53 14.1	5.99	5 45.6	12	6 16 53.01	6.058	25 12 18.9	3.50	4 55.3
13	5 7 13.08	5.460	24 55 35.1	5.75	5 43.8	13	6 19 18.54	6.070	25 10 50.9	3.85	4 53.8
14	5 9 24.46	5.490	24 57 50.2	5.50	5 42.1	14	6 21 44.35	6.081	25 9 14.4	4.20	4 52.3
15	5 11 36.54	5.519	24 59 59.3	5.25	5 40.3	15	6 24 10.42	6.092	25 7 29.3	4.56	4 50.8
16	5 13 49.31	+5.547	+25 2 2.3	+4.99	5 38.6	16	6 26 36.74	+6.102	+25 5 35.7	− 4.92	4 49.3
17	5 16 2.75	5.575	25 3 59.0	4.73	5 36.9	17	6 29 3.30	6.112	25 3 33.5	5.28	4 47.8
18	5 18 16.85	5.602	25 5 49.3	4.46	5 35.2	18	6 31 30.10	6.122	25 1 22.7	5.63	4 46.3
19	5 20 31.58	5.628	25 7 33.1	4.19	5 33.5	19	6 33 57.11	6.130	24 59 3.3	5.99	4 44.8
20	5 22 46.94	5.653	25 9 10.3	3.91	5 31.8	20	6 36 24.32	6.138	24 56 35.1	6.36	4 43.3
21	5 25 2.90	+5.678	+25 10 40.8	+3.63	5 30.1	21	6 38 51.72	+6.146	+24 53 58.2	− 6.72	4 41.8
22	5 27 19.45	5.702	25 12 4.5	3.34	5 28.5	22	6 41 19.29	6.153	24 51 12.5	7.09	4 40.3
23	5 29 36.57	5.725	25 13 21.2	3.04	5 26.8	23	6 43 47.02	6.160	24 48 18.1	7.45	4 38.9
24	5 31 54.23	5.748	25 14 30.7	2.74	5 25.2	24	6 46 14.91	6.166	24 45 14.9	7.82	4 37.4
25	5 34 12.43	5.770	25 15 33.0	2.44	5 23.5	25	6 48 42.93	6.171	24 42 3.0	8.19	4 35.9
26	5 36 31.14	+5.791	+25 16 28.2	+2.14	5 21.9	26	6 51 11.07	+6.176	+24 38 42.2	− 8.55	4 34.4
27	5 38 50.35	5.811	25 17 16.0	1.83	5 20.3	27	6 53 39.32	6.180	24 35 12.6	8.92	4 33.0
28	5 41 10.04	5.831	25 17 56.3	1.52	5 18.7	28	6 56 7.67	6.184	24 31 34.2	9.29	4 31.5
29	5 43 30.19	5.849	25 18 29.0	1.21	5 17.1	29	6 58 36.11	6.187	24 27 46.9	9.65	4 30.0
30	5 45 50.78	5.868	25 18 54.2	0.89	5 15.5	30	7 1 4.62	6.190	24 23 50.9	10.02	4 28.6
31	5 48 11.80	+5.886	+25 19 11.7	+0.57	5 13.9	31	7 3 33.21	+6.193	+24 19 46.1	−10.39	4 27.1
32	5 50 33.23	+5.902	+25 19 21.5	+0.25	5 12.3	32	7 6 1.87	+6.196	+24 15 32.6	−10.76	4 25.6

Day of the Month.	5th.	10th.	15th.	20th.	25th.	30th.	Day of the Month.	4th.	9th.	14th.	19th.	24th.	29th.
	″	″	″	″	″	″		″	″	″	″	″	″
Semidiameter . . .	3.92	3.77	3.63	3.51	3.39	3.28	Semidiameter . . .	3.18	3.09	3.00	2.92	2.85	2.78
Horizontal Parallax	6.82	6.57	6.33	6.11	5.91	5.72	Horizontal Parallax	5.55	5.38	5.23	5.09	4.96	4.84

NOTE.—The sign + prefixed to the hourly change of declination indicates that north declinations are increasing; the sign − indicates that north declinations are decreasing.

MARS, 1912.

GREENWICH MEAN TIME.

MAY.

Day of Month.	Apparent Right Ascension. Noon.	Var. of R. A. for 1 Hour. Noon.	Apparent Declination. Noon.	Var. of Decl. for 1 Hour. Noon.	Meridian Passage.
	h m s	s	° ′ ″	″	h m
1	7 3 33.21	+6.193	+24 19 46.1	−10.39	4 27.1
2	7 6 1.87	6.196	24 15 32.6	10.76	4 25.6
3	7 8 30.58	6.198	24 11 10.2	11.12	4 24.2
4	7 10 59.34	6.199	24 6 38.9	11.49	4 22.7
5	7 13 28.14	6.201	24 1 58.8	11.86	4 21.3
6	7 15 56.98	+6.203	+23 57 10.0	−12.22	4 19.8
7	7 18 25.85	6.204	23 52 12.5	12.58	4 18.3
8	7 20 54.74	6.205	23 47 6.2	12.95	4 16.9
9	7 23 23.66	6.206	23 41 51.1	13.31	4 15.4
10	7 25 52.59	6.206	23 36 27.3	13.67	4 13.9
11	7 28 21.52	+6.206	+23 30 54.8	−14.04	4 12.5
12	7 30 50.45	6.206	23 25 13.6	14.40	4 11.0
13	7 33 19.38	6.206	23 19 23.7	14.76	4 9.6
14	7 35 48.30	6.205	23 13 25.1	15.12	4 8.1
15	7 38 17.20	6.205	23 7 17.9	15.48	4 6.7
16	7 40 46.08	+6.204	+23 1 2.0	−15.84	4 5.2
17	7 43 14.92	6.202	22 54 37.5	16.20	4 3.7
18	7 45 43.72	6.200	22 48 4.4	16.56	4 2.3
19	7 48 12.47	6.197	22 41 22.8	16.92	4 0.8
20	7 50 41.17	6.195	22 34 32.6	17.27	3 59.3
21	7 53 9.80	+6.192	+22 27 33.9	−17.62	3 57.9
22	7 55 38.36	6.189	22 20 26.8	17.97	3 56.4
23	7 58 6.84	6.185	22 13 11.4	18.32	3 54.9
24	8 0 35.23	6.181	22 5 47.6	18.67	3 53.5
25	8 3 3.52	6.177	21 58 15.6	19.01	3 52.0
26	8 5 31.71	+6.172	+21 50 35.3	−19.35	3 50.5
27	8 7 59.80	6.168	21 42 46.8	19.69	3 49.1
28	8 10 27.77	6.163	21 34 50.2	20.03	3 47.6
29	8 12 55.63	6.159	21 26 45.6	20.37	3 46.1
30	8 15 23.37	6.154	21 18 32.9	20.70	3 44.6
31	8 17 50.99	+6.148	+21 10 12.1	−21.03	3 43.1
32	8 20 18.48	+6.143	+21 1 43.4	−21.37	3 41.7

Day of the Month.	4th.	9th.	14th.	19th.	24th.	29th.
	″	″	″	″	″	″
Semidiameter	2.71	2.65	2.59	2.54	2.49	2.45
Horizontal Parallax . . .	4.72	4.62	4.52	4.43	4.34	4.26

JUNE.

Day of Month.	Apparent Right Ascension. Noon.	Var. of R. A. for 1 Hour. Noon.	Apparent Declination. Noon.	Var. of Decl. for 1 Hour. Noon.	Me ian sa
	h m s	s	° ′ ″	″	h
1	8 20 18.48	+6.143	+21 1 43.4	−21.37	3
2	8 22 45.84	6.137	20 53 6.7	21.70	3
3	8 25 13.07	6.132	20 44 22.2	22.02	3
4	8 27 40.18	6.127	20 35 30.0	22.34	3
5	8 30 7.18	6.122	20 26 30.0	22.66	3
6	8 32 34.05	+6.117	+20 17 22.2	−22.98	3
7	8 35 0.77	6.111	20 8 6.8	23.30	3
8	8 37 27.36	6.106	19 58 43.9	23.61	3
9	8 39 53.82	6.100	19 49 13.4	23.93	3
10	8 42 20.15	6.095	19 39 35.3	24.25	3
11	8 44 46.34	+6.089	+19 29 49.7	−24.56	3
12	8 47 12.39	6.083	19 19 56.7	24.87	3
13	8 49 38.31	6.077	19 9 56.3	25.17	3
14	8 52 4.09	6.071	18 59 48.7	25.48	3
15	8 54 29.73	6.065	18 49 33.8	25.78	3
16	8 56 55.23	+6.060	+18 39 11.7	−26.07	3
17	8 59 20.58	6.054	18 28 42.6	26.37	3
18	9 1 45.78	6.048	18 18 6.4	26.66	3
19	9 4 10.83	6.041	18 7 23.2	26.95	3
20	9 6 35.72	6.034	17 56 33.1	27.23	3
21	9 9 0.45	+6.027	+17 45 36.2	−27.51	3
22	9 11 25.02	6.020	17 34 32.7	27.79	3
23	9 13 49.43	6.014	17 23 22.5	28.07	3
24	9 16 13.68	6.007	17 12 5.7	28.34	3
25	9 18 37.76	6.000	17 0 42.4	28.61	3
26	9 21 1.69	+5.994	+16 49 12.7	−28.87	3
27	9 23 25.46	5.987	16 37 36.6	29.14	3
28	9 25 49.07	5.981	16 25 54.2	29.40	3
29	9 28 12.53	5.974	16 14 5.6	29.66	2
30	9 30 35.83	5.968	16 2 10.9	29.92	2
31	9 32 58.98	+5.961	+15 50 10.1	−30.17	2
32	9 35 21.98	+5.955	+15 38 3.2	−30.41	2

Day of the Month.	3d.	8th.	13th.	18th.	23d.
	″	″	″	″	″
Semidiameter	2.40	2.36	2.32	2.29	2.26
Horizontal Parallax . . .	4.18	4.11	4.05	3.99	3.93

Note.—The sign + indicates north declinations; the sign — indicates south declinations.

MARS, 1912.

GREENWICH MEAN TIME.

JULY.						AUGUST.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.
	Noon.	*Noon.*	*Noon.*	*Noon.*			*Noon.*	*Noon.*	*Noon.*	*Noon.*	
	h m s	s	° ′ ″	″	h m		h m s	s	° ′ ″	″	h m
1	9 32 58.98	+5.961	+15 50 10.1	−30.17	2 56.1	1	10 45 57.13	+5.827	+8 53 39.8	−36.49	2 6.9
2	9 35 21.98	5.955	15 38 3.2	30.41	2 54.5	2	10 48 16.95	5.825	8 39 2.2	36.65	2 5.3
3	9 37 44.83	5.949	15 25 50.4	30.66	2 53.0	3	10 50 36.73	5.824	8 24 20.8	36.80	2 3.7
4	9 40 7.55	5.944	15 13 31.6	30.91	2 51.4	4	10 52 56.47	5.822	8 9 35.9	36.94	2 2.1
5	9 42 30.13	5.938	15 1 7.0	31.15	2 49.9	5	10 55 16.19	5.821	7 54 47.6	37.09	2 0.5
6	9 44 52.57	+5.932	+14 48 36.6	−31.39	2 48.3	6	10 57 35.89	+5.820	+7 39 55.8	−37.23	1 58.9
7	9 47 14.88	5.927	14 36 0.5	31.63	2 46.7	7	10 59 55.58	5.820	7 25 0.6	37.37	1 57.2
8	9 49 37.06	5.922	14 23 18.7	31.86	2 45.2	8	11 2 15.26	5.820	7 10 2.1	37.51	1 55.6
9	9 51 59.12	5.917	14 10 31.3	32.09	2 43.6	9	11 4 34.93	5.820	6 55 0.4	37.64	1 54.0
10	9 54 21.06	5.912	13 57 38.4	32.32	2 42.0	10	11 6 54.59	5.820	6 39 55.6	37.77	1 52.4
11	9 56 42.88	+5.907	+13 44 40.0	−32.55	2 40.4	11	11 9 14.26	+5.820	+6 24 47.8	−37.89	1 50.8
12	9 59 4.58	5.902	13 31 36.3	32.77	2 38.8	12	11 11 33.96	5.821	6 9 37.1	38.01	1 49.2
13	10 1 26.17	5.897	13 18 27.3	32.99	2 37.3	13	11 13 53.67	5.822	5 54 23.6	38.12	1 47.6
14	10 3 47.64	5.892	13 5 13.0	33.20	2 35.7	14	11 16 13.40	5.822	5 39 7.3	38.24	1 45.9
15	10 6 9.00	5.888	12 51 53.5	33.42	2 34.1	15	11 18 33.14	5.823	5 23 48.3	38.35	1 44.3
16	10 8 30.25	+5.884	+12 38 29.0	−33.63	2 32.5	16	11 20 52.90	+5.824	+5 8 26.7	−38.46	1 42.7
17	10 10 51.39	5.879	12 24 59.5	33.83	2 30.9	17	11 23 12.69	5.825	4 53 2.7	38.56	1 41.1
18	10 13 12.43	5.874	12 11 25.2	34.03	2 29.3	18	11 25 32.52	5.827	4 37 36.3	38.65	1 39.5
19	10 15 33.35	5.870	11 57 46.1	34.23	2 27.7	19	11 27 52.39	5.829	4 22 7.6	38.74	1 37.9
20	10 17 54.17	5.866	11 44 2.3	34.42	2 26.1	20	11 30 12.30	5.831	4 6 36.8	38.83	1 36.3
21	10 20 14.89	+5.861	+11 30 13.9	−34.61	2 24.6	21	11 32 32.26	+5.833	+3 51 4.0	−38.92	1 34.7
22	10 22 35.51	5.857	11 16 20.9	34.80	2 23.0	22	11 34 52.27	5.836	3 35 29.1	39.00	1 33.1
23	10 24 56.03	5.853	11 2 23.5	34.99	2 21.4	23	11 37 12.34	5.838	3 19 52.3	39.08	1 31.5
24	10 27 16.46	5.849	10 48 21.7	35.17	2 19.8	24	11 39 32.48	5.841	3 4 13.7	39.15	1 29.9
25	10 29 36.80	5.846	10 34 15.6	35.34	2 18.2	25	11 41 52.70	5.844	2 48 33.4	39.22	1 28.3
26	10 31 57.05	+5.842	+10 20 5.4	−35.51	2 16.6	26	11 44 12.99	+5.847	+2 32 51.4	−39.28	1 26.7
27	10 34 17.23	5.839	10 5 51.1	35.69	2 15.0	27	11 46 33.36	5.851	2 17 7.9	39.34	1 25.0
28	10 36 37.33	5.836	9 51 32.7	35.86	2 13.3	28	11 48 53.84	5.855	2 1 22.9	39.40	1 23.4
29	10 38 57.37	5.834	9 37 10.3	36.02	2 11.7	29	11 51 14.42	5.860	1 45 36.4	39.46	1 21.8
30	10 41 17.35	5.831	9 22 43.9	36.18	2 10.1	30	11 53 35.11	5.865	1 29 48.6	39.52	1 20.3
31	10 43 37.27	+5.829	+ 9 8 13.7	−36.34	2 8.5	31	11 55 55.92	+5.870	+1 13 59.6	−39.57	1 18.7
32	10 45 57.13	+5.827	+ 8 53 39.8	−36.49	2 6.9	32	11 58 16.85	+5.875	+0 58 9.5	−39.62	1 17.1

Day of the Month.	3d.	8th.	13th.	18th.	23d.	28th.	Day of the Month.	2d.	7th.	12th.	17th.	22d.	27th.
	″	″	″	″	″	″		″	″	″	″	″	″
Semidiameter . . .	2.20	2.17	2.15	2.12	2.10	2.08	Semidiameter . . .	2.07	2.05	2.04	2.02	2.01	2.00
Horizontal Parallax	3.83	3.78	3.74	3.70	3.66	3.63	Horizontal Parallax	3.60	3.57	3.55	3.52	3.50	3.48

Note.—The sign − prefixed to the hourly change of declination indicates that north declinations are decreasing.

MARS, 1912.

GREENWICH MEAN TIME.

SEPTEMBER.						OCTOBER.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.
	Noon.	*Noon.*	*Noon.*	*Noon.*			*Noon.*	*Noon.*	*Noon.*	*Noon.*	
	h m s	s	° ′ ″	″	h m		h m s	s	° ′ ″	″	h m
1	11 58 16.85	+5.875	+0 58 9.5	−39.62	1 17.1	1	13 10 15.69	+6.162	− 6 58 3.5	−39.09	0 30.8
2	12 0 37.91	5.881	0 42 18.1	39.66	1 15.5	2	13 12 43.76	6.176	7 13 40.9	39.01	0 29.3
3	12 2 59.12	5.887	0 26 25.7	39.70	1 13.9	3	13 15 12.18	6.191	7 29 16.2	38.92	0 27.8
4	12 5 20.47	5.893	+0 10 32.4	39.74	1 12.3	4	13 17 40.95	6.206	7 44 49.3	38.82	0 26.4
5	12 7 41.98	5.900	−0 5 21.7	39.77	1 10.7	5	13 20 10.07	6.222	8 0 20.1	38.72	0 24.9
6	12 10 3.66	+5.907	−0 21 16.5	−39.80	1 9.2	6	13 22 39.56	+6.237	− 8 15 48.4	−38.62	0 23.5
7	12 12 25.50	5.914	0 37 12.0	39.82	1 7.6	7	13 25 9.43	6.253	8 31 14.2	38.51	0 22.0
8	12 14 47.52	5.922	0 53 8.1	39.84	1 6.0	8	13 27 39.68	6.269	8 46 37.4	38.40	0 20.6
9	12 17 9.72	5.929	1 9 4.7	39.86	1 4.4	9	13 30 10.31	6.285	9 1 57.8	38.28	0 19.2
10	12 19 32.10	5.937	1 25 1.6	39.87	1 2.9	10	13 32 41.33	6.302	9 17 15.2	38.16	0 17.8
11	12 21 54.68	+5.945	−1 40 58.7	−39.88	1 1.3	11	13 35 12.75	+6.318	− 9 32 29.5	−38.03	0 16.4
12	12 24 17.46	5.953	1 56 56.0	39.88	0 59.7	12	13 37 44.57	6.334	9 47 40.6	37.89	0 15.0
13	12 26 40.44	5.962	2 12 53.3	39.88	0 58.2	13	13 40 16.79	6.351	10 2 48.4	37.75	0 13.6
14	12 29 3.63	5.971	2 28 50.5	39.88	0 56.6	14	13 42 49.42	6.368	10 17 52.7	37.60	0 12.2
15	12 31 27.03	5.980	2 44 47.5	39.87	0 55.1	15	13 45 22.46	6.385	10 32 53.4	37.45	0 10.8
16	12 33 50.65	+5.989	−3 0 44.1	−39.85	0 53.5	16	13 47 55.91	+6.403	−10 47 50.2	−37.29	0 9.4
17	12 36 14.49	5.998	3 16 40.3	39.83	0 52.0	17	13 50 29.79	6.421	11 2 43.1	37.12	0 8.0
18	12 38 38.56	6.008	3 32 35.9	39.80	0 50.5	18	13 53 4.11	6.439	11 17 32.0	36.95	0 6.6
19	12 41 2.87	6.018	3 48 30.9	39.77	0 48.9	19	13 55 38.87	6.458	11 32 16.8	36.78	0 5.3
20	12 43 27.42	6.029	4 4 25.2	39.74	0 47.4	20	13 58 14.06	6.476	11 46 57.4	36.59	0 3.9
21	12 45 52.23	+6.039	−4 20 18.6	−39.70	0 45.9	21	14 0 49.70	+6.495	−12 1 33.6	−36.40	0 2.6
22	12 48 17.29	6.050	4 36 11.0	39.66	0 44.3	22	14 3 25.80	6.514	12 16 5.1	36.21	0 1.3 23 58.9
23	12 50 42.61	6.061	4 52 2.4	39.62	0 42.8	23	14 6 2.36	6.533	12 30 31.9	36.02	23 58.6
24	12 53 8.20	6.072	5 7 52.6	39.57	0 41.3	24	14 8 39.39	6.553	12 44 54.0	35.82	23 57.3
25	12 55 34.07	6.084	5 23 41.6	39.52	0 39.8	25	14 11 16.89	6.573	12 59 11.2	35.61	23 56.0
26	12 58 0.23	+6.097	−5 39 29.2	−39.46	0 38.3	26	14 13 54.88	+6.593	−13 13 23.3	−35.39	23 54.7
27	13 0 26.70	6.109	5 55 15.4	39.39	0 36.8	27	14 16 33.35	6.614	13 27 30.2	35.17	23 53.4
28	13 2 53.47	6.122	6 11 0.0	39.32	0 35.3	28	14 19 12.32	6.635	13 41 31.8	34.94	23 52.1
29	13 5 20.55	6.136	6 26 42.9	39.25	0 33.8	29	14 21 51.79	6.656	13 55 28.0	34.71	23 50.8
30	13 7 47.95	6.149	6 42 24.1	39.17	0 32.3	30	14 24 31.77	6.677	14 9 18.5	34.48	23 49.6
31	13 10 15.69	+6.162	−6 58 3.5	−39.09	0 30.8	31	14 27 12.26	+6.698	−14 23 3.3	−34.24	23 48.3
32	13 12 43.76	+6.176	−7 13 40.9	−39.01	0 29.3	32	14 29 53.27	+6.720	−14 36 42.3	−34.00	23 47.0

Day of the Month.	1st.	6th.	11th.	16th.	21st.	26th.	Day of the Month.	1st.	6th.	11th.	16th.	21st.	26th.	31st.
	″	″	″	″	″	″		″	″	″	″	″	″	″
Semidiameter.	1.99	1.98	1.97	1.97	1.97	1.97	Semidiameter . . .	1.96	1.96	1.96	1.96	1.96	1.97	1.97
Horizontal Parallax . . .	3.47	3.45	3.44	3.43	3.43	3.43	Horizontal Parallax	3.42	3.41	3.41	3.42	3.42	3.43	3.43

Note.—The sign + indicates north declinations; the sign − indicates south declinations.

MARS, 1912.

GREENWICH MEAN TIME.

NOVEMBER.						DECEMBER.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.
	Noon.	*Noon.*	*Noon.*	*Noon.*			*Noon.*	*Noon.*	*Noon.*	*Noon.*	
	h m s	s	° ′ ″	″	h m		h m s	s	° ′ ″	″	h m
1	14 29 53.27	+ 6.720	−14 36 42.3	−34.00	23 47.0	1	15 54 38.97	+ 7.417	−20 28 5.8	−23.60	23 13.8
2	14 32 34.81	6.742	14 50 15.3	33.74	23 45.8	2	15 57 37.25	7.440	20 37 27.1	23.16	23 12.8
3	14 35 16.88	6.764	15 3 42.1	33.48	23 44.6	3	16 0 36.10	7.464	20 46 37.7	22.70	23 11.9
4	14 37 59.49	6.787	15 17 2.6	33.22	23 43.3	4	16 3 35.51	7.487	20 55 37.4	22.24	23 11.0
5	14 40 42.63	6.809	15 30 16.7	32.95	23 42.1	5	16 6 35.48	7.510	21 4 26.0	21.78	23 10.0
6	14 43 26.31	+ 6.832	−15 43 24.2	−32.67	23 40.9	6	16 9 36.00	+ 7.533	−21 13 3.4	−21.32	23 9.1
7	14 46 10.54	6.855	15 56 24.9	32.38	23 39.7	7	16 12 37.07	7.556	21 21 29.4	20.84	23 8.2
8	14 48 55.31	6.878	16 9 18.7	32.09	23 38.5	8	16 15 38.67	7.578	21 29 43.9	20.36	23 7.3
9	14 51 40.63	6.900	16 22 5.4	31.79	23 37.4	9	16 18 40.80	7.600	21 37 46.8	19.86	23 6.4
10	14 54 26.50	6.923	16 34 44.9	31.48	23 36.2	10	16 21 43.46	7.622	21 45 37.8	19.37	23 5.5
11	14 57 12.92	+ 6.946	−16 47 16.9	−31.17	23 35.0	11	16 24 46.65	+ 7.643	−21 53 16.8	−18.87	23 4.6
12	14 59 59.89	6.969	16 59 41.4	30.85	23 33.9	12	16 27 50.35	7.665	22 0 43.7	18.36	23 3.7
13	15 2 47.42	6.992	17 11 58.2	30.53	23 32.7	13	16 30 54.56	7.686	22 7 58.4	17.84	23 2.9
14	15 5 35.50	7.015	17 24 7.1	30.20	23 31.6	14	16 33 59.27	7.707	22 15 0.7	17.32	23 2.0
15	15 8 24.13	7.038	17 36 7.9	29.86	23 30.5	15	16 37 4.47	7.727	22 21 50.5	16.80	23 1.2
16	15 11 13.31	+ 7.061	−17 48 0.6	−29.52	23 29.4	16	16 40 10.15	+ 7.747	−22 28 27.6	−16.27	23 0.3
17	15 14 3.05	7.085	17 59 44.9	29.16	23 28.3	17	16 43 16.31	7.767	22 34 52.0	15.74	22 59.5
18	15 16 53.35	7.108	18 11 20.7	28.80	23 27.2	18	16 46 22.95	7.786	22 41 3.5	15.20	22 58.7
19	15 19 44.22	7.132	18 22 47.8	28.44	23 26.1	19	16 49 30.05	7.805	22 47 1.9	14.65	22 57.9
20	15 22 35.66	7.155	18 34 6.2	28.07	23 25.0	20	16 52 37.61	7.824	22 52 47.2	14.10	22 57.1
21	15 25 27.66	+ 7.179	−18 45 15.6	−27.70	23 24.0	21	16 55 45.62	+ 7.843	−22 58 19.2	−13.54	22 56.3
22	15 28 20.22	7.202	18 56 16.0	27.32	23 22.9	22	16 58 54.06	7.861	23 3 37.8	12.98	22 55.5
23	15 31 13.35	7.226	19 7 7.1	26.93	23 21.8	23	17 2 2.94	7.879	23 8 43.0	12.42	22 54.7
24	15 34 7.04	7.250	19 17 48.8	26.53	23 20.8	24	17 5 12.25	7.897	23 13 34.6	11.86	22 53.9
25	15 37 1.31	7.273	19 28 21.0	26.13	23 19.8	25	17 8 21.98	7.914	23 18 12.4	11.28	22 53.1
26	15 39 56.15	+ 7.297	−19 38 43.5	−25.72	23 18.8	26	17 11 32.11	+ 7.931	−23 22 36.4	−10.70	22 52.3
27	15 42 51.57	7.321	19 48 56.2	25.31	23 17.8	27	17 14 42.65	7.948	23 26 46.5	10.12	22 51.6
28	15 45 47.56	7.345	19 58 59.0	24.90	23 16.8	28	17 17 53.59	7.964	23 30 42.6	9.53	22 50.8
29	15 48 44.12	7.369	20 8 51.7	24.47	23 15.8	29	17 21 4.91	7.979	23 34 24.6	8.94	22 50.1
30	15 51 41.25	7.393	20 18 34.0	24.04	23 14.8	30	17 24 16.60	7.994	23 37 52.3	8.34	22 49.3
31	15 54 38.97	+ 7.417	−20 28 5.8	−23.60	23 13.8	31	17 27 28.65	+ 8.009	−23 41 5.6	− 7.74	22 48.6
32	15 57 37.25	+ 7.440	−20 37 27.1	−23.16	23 12.8	32	17 30 41.05	+ 8.024	−23 44 4.6	− 7.14	22 47.9

Day of the Month.	5th.	10th.	15th.	20th.	25th.	30th.
	″	″	″	″	″	″
Semidiameter	1.98	1.98	1.99	2.00	2.01	2.02
Horizontal Parallax . . .	3.44	3.45	3.47	3.48	3.50	3.51

Day of the Month.	5th.	10th.	15th.	20th.	25th.	30th.	35th.
	″	″	″	″	″	″	″
Semidiameter . . .	2.03	2.04	2.05	2.07	2.08	2.10	2.11
Horizontal Parallax	3.53	3.55	3.58	3.60	3.62	3.65	3.68

NOTE.—The sign − prefixed to the hourly change of declination indicates that south declinations are increasing.

JUPITER, 1912.

GREENWICH MEAN TIME.

JANUARY.

Day of Month.	Apparent Right Ascension. Noon.	Var. of R. A. for 1 Hour. Noon.	Apparent Declination. Noon.	Var. of Decl. for 1 Hour. Noon.	Meridian Passage.
	h m s	s	° ′ ″	″	h m
1	16 11 15.82	+2.112	−20 20 23.9	−5.50	21 29.4
2	16 12 6.38	2.102	20 22 34.9	5.43	21 26.3
3	16 12 56.71	2.092	20 24 44.3	5.36	21 23.2
4	16 13 46.79	2.082	20 26 52.1	5.29	21 20.1
5	16 14 36.63	2.072	20 28 58.2	5.22	21 17.0
6	16 15 26.22	+2.061	−20 31 2.6	−5.15	21 13.9
7	16 16 15.55	2.050	20 33 5.3	5.08	21 10.7
8	16 17 4.61	2.039	20 35 6.4	5.01	21 7.6
9	16 17 53.40	2.027	20 37 5.8	4.94	21 4.5
10	16 18 41.92	2.015	20 39 3.5	4.87	21 1.4
11	16 19 30.14	+2.003	−20 40 59.5	−4.80	20 58.2
12	16 20 18.06	1.991	20 42 53.8	4.73	20 55.1
13	16 21 5.68	1.978	20 44 46.4	4.66	20 51.9
14	16 21 52.99	1.965	20 46 37.3	4.59	20 48.8
15	16 22 39.98	1.951	20 48 26.5	4.52	20 45.6
16	16 23 26.64	+1.937	−20 50 14.0	−4.45	20 42.5
17	16 24 12.96	1.923	20 51 59.8	4.37	20 39.3
18	16 24 58.94	1.909	20 53 43.9	4.30	20 36.1
19	16 25 44.56	1.894	20 55 26.2	4.23	20 32.9
20	16 26 29.83	1.879	20 57 6.8	4.16	20 29.8
21	16 27 14.73	+1.863	−20 58 45.7	−4.09	20 26.6
22	16 27 59.25	1.847	21 0 22.9	4.02	20 23.4
23	16 28 43.39	1.831	21 1 58.5	3.95	20 20.2
24	16 29 27.13	1.814	21 3 32.4	3.88	20 17.0
25	16 30 10.47	1.797	21 5 4.5	3.81	20 13.8
26	16 30 53.40	+1.780	−21 6 35.0	−3.74	20 10.6
27	16 31 35.92	1.763	21 8 3.9	3.67	20 7.3
28	16 32 18.02	1.745	21 9 31.2	3.60	20 4.1
29	16 32 59.69	1.727	21 10 56.7	3.53	20 0.8
30	16 33 40.92	1.708	21 12 20.5	3.46	19 57.6
31	16 34 21.71	+1.689	−21 13 42.7	−3.39	19 54.3
32	16 35 2.05	+1.670	−21 15 3.3	−3.33	19 51.0

Day of the Month.	0	8th.	16th.	24th.
	″	″	″	″
Semidiameter	15.29	15.50	15.74	16.01
Horizontal Parallax	1.43	1.45	1.47	1.50

FEBRUARY.

Day of Month.	Apparent Right Ascension. Noon.	Var. of R. A. for 1 Hour. Noon.	Apparent Declination. Noon.	Var. of Decl. for 1 Hour. Noon.	Meridian Passage.
	h m s	s	° ′ ″	″	h m
1	16 35 2.05	+1.670	−21 15 3.3	−3.33	19 51.0
2	16 35 41.94	1.651	21 16 22.3	3.26	19 47.7
3	16 36 21.36	1.632	21 17 39.7	3.19	19 44.4
4	16 37 0.31	1.612	21 18 55.4	3.12	19 41.1
5	16 37 38.78	1.592	21 20 9.5	3.05	19 37.8
6	16 38 16.77	+1.572	−21 21 22.1	−2.99	19 34.5
7	16 38 54.26	1.551	21 22 33.1	2.92	19 31.2
8	16 39 31.25	1.530	21 23 42.5	2.86	19 27.9
9	16 40 7.73	1.509	21 24 50.3	2.79	19 24.6
10	16 40 43.69	1.487	21 25 56.5	2.72	19 21.2
11	16 41 19.12	+1.465	−21 27 1.2	−2.66	19 17.9
12	16 41 54.01	1.443	21 28 4.4	2.59	19 14.5
13	16 42 28.36	1.420	21 29 6.0	2.53	19 11.1
14	16 43 2.16	1.397	21 30 6.0	2.46	19 7.7
15	16 43 35.39	1.373	21 31 4.5	2.40	19 4.3
16	16 44 8.05	+1.349	−21 32 1.5	−2.34	19 0.9
17	16 44 40.14	1.325	21 32 56.9	2.27	18 57.5
18	16 45 11.64	1.300	21 33 50.8	2.21	18 54.1
19	16 45 42.54	1.275	21 34 43.3	2.15	18 50.7
20	16 46 12.84	1.250	21 35 34.3	2.09	18 47.2
21	16 46 42.53	+1.224	−21 36 23.7	−2.03	18 43.8
22	16 47 11.60	1.198	21 37 11.7	1.97	18 40.3
23	16 47 40.05	1.172	21 37 58.3	1.91	18 36.9
24	16 48 7.87	1.146	21 38 43.4	1.85	18 33.4
25	16 48 35.05	1.119	21 39 27.1	1.79	18 29.9
26	16 49 1.58	+1.092	−21 40 9.4	−1.73	18 26.4
27	16 49 27.46	1.065	21 40 50.3	1.67	18 22.9
28	16 49 52.69	1.038	21 41 29.7	1.61	18 19.4
29	16 50 17.26	1.010	21 42 7.8	1.56	18 15.9
30	16 50 41.17	0.982	21 42 44.5	1.50	18 12.3
31	16 51 4.40	+0.954	−21 43 19.9	−1.45	18 8.8
32	16 51 26.94	+0.926	−21 43 53.9	−1.39	18 5.2

Day of the Month.	1st.	9th.	17th.	25th.
	″	″	″	″
Semidiameter	16.31	16.65	17.02	17.42
Horizontal Parallax	1.53	1.56	1.59	1.63

NOTE.—The sign + indicates north declinations; the sign − indicates south declinations.

GREENWICH MEAN TIME.

MARCH.						APRIL.				
rent Ascen- on.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.
on.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
s	s	° ′ ″	″	h m		h m s	s	° ′ ″	″	h m
41.17	+0.982	−21 42 44.5	−1.50	18 12.3	1	16 56 57.62	+0.001	−21 51 4.6	+0.11	16 16.4
4.40	0.954	21 43 19.9	1.45	18 8.8	2	16 56 57.26	−0.032	21 51 1.4	0.16	16 12.4
26.94	0.926	21 43 53.9	1.39	18 5.2	3	16 56 56.09	0.066	21 50 57.1	0.21	16 8.5
48.80	0.897	21 44 26.6	1.33	18 1.6	4	16 56 54.12	0.099	21 50 51.6	0.26	16 4.5
9.96	0.868	21 44 57.9	1.28	17 58.0	5	16 56 51.35	0.132	21 50 44.9	0.31	16 0.5
30.42	+0.838	−21 45 27.9	−1.22	17 54.4	6	16 56 47.78	−0.166	−21 50 37.1	+0.35	15 56.5
50.18	0.808	21 45 56.6	1.17	17 50.8	7	16 56 43.40	0.199	21 50 28.1	0.40	15 52.5
9.22	0.778	21 46 24.0	1.11	17 47.2	8	16 56 38.22	0.232	21 50 18.0	0.45	15 48.5
27.54	0.748	21 46 50.1	1.06	17 43.5	9	16 56 32.24	0.265	21 50 6.8	0.50	15 44.5
45.14	0.718	21 47 14.8	1.00	17 39.9	10	16 56 25.47	0.299	21 49 54.4	0.55	15 40.4
2.00	+0.687	−21 47 38.2	−0.95	17 36.2	11	16 56 17.90	−0.332	−21 49 40.8	+0.59	15 36.3
18.11	0.656	21 48 0.4	0.90	17 32.6	12	16 56 9.54	0.365	21 49 26.1	0.64	15 32.2
33.48	0.625	21 48 21.3	0.84	17 28.9	13	16 56 0.39	0.398	21 49 10.2	0.69	15 28.1
48.10	0.594	21 48 40.9	0.78	17 25.2	14	16 55 50.46	0.430	21 48 53.2	0.74	15 24.0
1.96	0.562	21 48 59.2	0.73	17 21.5	15	16 55 39.75	0.462	21 48 35.1	0.79	15 19.9
15.05	+0.530	−21 49 16.3	−0.68	17 17.8	16	16 55 28.26	−0.494	−21 48 15.9	+0.83	15 15.8
27.37	0.498	21 49 32.2	0.63	17 14.0	17	16 55 16.00	0.526	21 47 55.5	0.88	15 11.7
38.92	0.466	21 49 46.8	0.58	17 10.3	18	16 55 2.99	0.558	21 47 34.0	0.93	15 7.5
49.69	0.433	21 50 0.2	0.53	17 6.5	19	16 54 49.23	0.589	21 47 11.4	0.98	15 3.4
59.67	0.400	21 50 12.3	0.48	17 2.7	20	16 54 34.72	0.620	21 46 47.7	1.02	14 59.2
8.87	+0.367	−21 50 23.2	−0.43	16 58.9	21	16 54 19.47	−0.651	−21 46 22.8	+1.06	14 55.0
17.28	0.334	21 50 32.8	0.38	16 55.1	22	16 54 3.49	0.681	21 45 56.8	1.11	14 50.8
24.90	0.301	21 50 41.2	0.33	16 51.3	23	16 53 46.81	0.711	21 45 29.8	1.15	14 46.6
31.73	0.268	21 50 48.5	0.28	16 47.5	24	16 53 29.43	0.740	21 45 1.7	1.20	14 42.3
37.76	0.235	21 50 54.6	0.23	16 43.6	25	16 53 11.35	0.768	21 44 32.5	1.25	14 38.1
42.99	+0.202	−21 50 59.5	−0.18	16 39.8	26	16 52 52.59	−0.795	−21 44 2.2	+1.29	14 33.8
47.42	0.168	21 51 3.2	0.13	16 35.9	27	16 52 33.16	0.823	21 43 30.9	1.34	14 29.6
51.06	0.135	21 51 5.8	0.08	16 32.0	28	16 52 13.08	0.850	21 42 58.5	1.38	14 25.3
53.90	0.102	21 51 7.3	−0.03	16 28.1	29	16 51 52.35	0.877	21 42 25.1	1.42	14 21.0
55.94	0.069	21 51 7.6	+0.02	16 24.2	30	16 51 30.99	0.903	21 41 50.6	1.46	14 16.7
57.18	+0.035	−21 51 6.7	+0.07	16 20.3	31	16 51 9.00	−0.929	−21 41 15.1	+1.50	14 12.4
57.62	+0.001	−21 51 4.6	+0.11	16 16.4	32	16 50 46.40	−0.954	−21 40 38.5	+1.55	14 8.1

of the Month.	4th.	12th.	20th.	28th.	Day of the Month.	5th.	13th.	21st.	29th.
	″	″	″	″		″	″	″	″
neter	17.85	18.30	18.77	19.24	Semidiameter	19.71	20.17	20.60	20.98
al Parallax . .	1.67	1.71	1.76	1.80	Horizontal Parallax .	1.84	1.89	1.93	1.96

gn + prefixed to the hourly change of declination indicates that south declinations are decreasing; the icates that south declinations are increasing.

JUPITER, 1912.

GREENWICH MEAN TIME.

MAY.						JUNE.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.
	Noon.	*Noon.*	*Noon.*	*Noon.*			*Noon.*	*Noon.*	*Noon.*	*Noon.*	
	h m s	s	° ′ ″	″	h m		h m s	s	° ′ ″	″	h m
1	16 51 9.00	−0.929	−21 41 15.1	+1.50	14 12.4	1	16 36 8.89	−1.355	−21 15 42.8	+2.44	11 55.5
2	16 50 46.40	0.954	21 40 38.5	1.55	14 8.1	2	16 35 36.36	1.355	21 14 44.2	2.45	11 51.0
3	16 50 23.21	0.979	21 40 0.8	1.59	14 3.8	3	16 35 3.84	1.354	21 13 45.4	2.45	11 46.6
4	16 49 59.44	1.002	21 39 22.2	1.63	13 59.4	4	16 34 31.36	1.352	21 12 46.5	2.46	11 42.2
5	16 49 35.09	1.025	21 38 42.6	1.67	13 55.1	5	16 33 58.95	1.349	21 11 47.5	2.46	11 37.8
6	16 49 10.19	−1.048	−21 38 2.0	+1.71	13 50.8	6	16 33 26.63	−1.345	−21 10 48.5	+2.46	11 33.3
7	16 48 44.75	1.070	21 37 20.3	1.75	13 46.5	7	16 32 54.42	1.340	21 9 49.5	2.45	11 28.8
8	16 48 18.79	1.092	21 36 37.7	1.79	13 42.1	8	16 32 22.35	1.334	21 8 50.5	2.45	11 24.3
9	16 47 52.32	1.113	21 35 54.1	1.83	13 37.7	9	16 31 50.42	1.327	21 7 51.6	2.44	11 19.8
10	16 47 25.36	1.133	21 35 9.6	1.87	13 33.3	10	16 31 18.67	1.319	21 6 52.9	2.43	11 15.4
11	16 46 57.92	−1.153	−21 34 24.1	+1.91	13 28.9	11	16 30 47.11	−1.310	−21 5 54.5	+2.42	11 10.9
12	16 46 30.03	1.171	21 33 37.7	1.95	13 24.5	12	16 30 15.77	1.300	21 4 56.3	2.41	11 6.5
13	16 46 1.70	1.189	21 32 50.4	1.99	13 20.1	13	16 29 44.68	1.289	21 3 58.4	2.40	11 2.0
14	16 45 32.96	1.206	21 32 2.3	2.02	13 15.7	14	16 29 13.85	1.278	21 3 0.9	2.39	10 57.6
15	16 45 3.82	1.222	21 31 13.3	2.06	13 11.3	15	16 28 43.30	1.266	21 2 3.8	2.37	10 53.1
16	16 44 34.30	−1.237	−21 30 23.5	+2.09	13 6.8	16	16 28 13.06	−1.253	−21 1 7.2	+2.35	10 48.7
17	16 44 4.43	1.252	21 29 33.0	2.12	13 2.4	17	16 27 43.15	1.239	21 0 11.2	2.33	10 44.2
18	16 43 34.22	1.265	21 28 41.7	2.15	12 57.9	18	16 27 13.59	1.224	20 59 15.8	2.30	10 39.8
19	16 43 3.70	1.278	21 27 49.6	2.18	12 53.5	19	16 26 44.41	1.208	20 58 21.0	2.27	10 35.4
20	16 42 32.89	1.289	21 26 56.8	2.21	12 49.0	20	16 26 15.62	1.191	20 57 26.9	2.24	10 31.0
21	16 42 1.82	−1.300	−21 26 3.5	+2.24	12 44.6	21	16 25 47.23	−1.174	−20 56 33.5	+2.21	10 26.6
22	16 41 30.51	1.310	21 25 9.5	2.27	12 40.1	22	16 25 19.27	1.156	20 55 41.0	2.18	10 22.2
23	16 40 58.97	1.319	21 24 14.9	2.29	12 35.7	23	16 24 51.76	1.137	20 54 49.3	2.14	10 17.8
24	16 40 27.23	1.326	21 23 19.7	2.31	12 31.2	24	16 24 24.70	1.117	20 53 58.4	2.10	10 13.5
25	16 39 55.32	1.333	21 22 24.1	2.33	12 26.7	25	16 23 58.12	1.097	20 53 8.5	2.06	10 9.1
26	16 39 23.26	−1.339	−21 21 28.0	+2.35	12 22.2	26	16 23 32.04	−1.077	−20 52 19.6	+2.02	10 4.8
27	16 38 51.07	1.344	21 20 31.3	2.37	12 17.8	27	16 23 6.47	1.056	20 51 31.8	1.98	10 0.4
28	16 38 18.77	1.348	21 19 34.2	2.39	12 13.3	28	16 22 41.41	1.034	20 50 45.0	1.93	9 56.0
29	16 37 46.38	1.351	21 18 36.9	2.41	12 8.8	29	16 22 16.89	1.011	20 49 59.3	1.88	9 51.7
30	16 37 13.92	1.353	21 17 39.2	2.42	12 4.3	30	16 21 52.92	0.987	20 49 14.8	1.83	9 47.3
31	16 36 41.41	−1.354	−21 16 41.1	+2.43	11 59.9	31	16 21 29.51	−0.963	−20 48 31.6	+1.78	9 43.0
32	16 36 8.89	−1.355	−21 15 42.8	+2.44	11 55.5	32	16 21 6.68	−0.938	−20 47 49.6	+1.73	9 38.7

Day of the Month.	7th.	15th.	23d.	31st.	Day of the Month.	8th.	16th.	24th.
	″	″	″	″		″	″	″
Semidiameter	21.31	21.57	21.74	21.82	Semidiameter	21.80	21.69	21.48
Horizontal Parallax . .	1.99	2.02	2.03	2.04	Horizontal Parallax	2.04	2.03	2.01

NOTE.—The sign + indicates north declinations; the sign — indicates south declinations.

JUPITER, 1912.

GREENWICH MEAN TIME.

JULY.						AUGUST.					
Day of Month.	Apparent Right Ascension. Noon.	Var. of R. A. for 1 Hour. Noon.	Apparent Declination. Noon.	Var. of Decl. for 1 Hour. Noon.	Meridian Passage.	Day of Month.	Apparent Right Ascension. Noon.	Var. of R. A. for 1 Hour. Noon.	Apparent Declination. Noon.	Var. of Decl. for 1 Hour. Noon.	Meridian Passage.
	h m s	s	° ′ ″	″	h m		h m s	s	° ′ ″	″	h m
1	16 21 29.51	−0.963	−20 48 31.6	+1.78	9 43.0	1	16 14 59.69	−0.043	−20 39 19.7	−0.44	7 34.9
2	16 21 6.68	0.938	20 47 49.6	1.73	9 38.7	2	16 14 59.06	−0.011	20 39 31.2	0.52	7 30.9
3	16 20 44.44	0.913	20 47 8.8	1.67	9 34.4	3	16 14 59.20	+0.021	20 39 44.6	0.60	7 27.0
4	16 20 22.80	0.888	20 46 29.4	1.61	9 30.1	4	16 15 0.11	0.054	20 39 59.9	0.68	7 23.1
5	16 20 1.77	0.862	20 45 51.4	1.55	9 25.8	5	16 15 1.79	0.087	20 40 17.1	0.76	7 19.2
6	16 19 41.37	−0.836	−20 45 14.8	+1.49	9 21.6	6	16 15 4.24	+0.119	−20 40 36.3	−0.84	7 15.3
7	16 19 21.61	0.809	20 44 39.6	1.43	9 17.3	7	16 15 7.47	0.151	20 40 57.4	0.92	7 11.4
8	16 19 2.50	0.782	20 44 5.9	1.37	9 13.1	8	16 15 11.47	0.183	20 41 20.4	1.00	7 7.5
9	16 18 44.04	0.755	20 43 33.8	1.31	9 8.9	9	16 15 16.25	0.215	20 41 45.3	1.08	7 3.6
10	16 18 26.25	0.727	20 43 3.2	1.24	9 4.7	10	16 15 21.80	0.247	20 42 12.0	1.16	6 59.8
11	16 18 9.14	−0.698	−20 42 34.2	+1.17	9 0.5	11	16 15 28.11	+0.279	−20 42 40.6	−1.24	6 56.0
12	16 17 52.73	0.669	20 42 6.9	1.10	8 56.3	12	16 15 35.19	0.311	20 43 11.2	1.32	6 52.2
13	16 17 37.02	0.640	20 41 41.3	1.03	8 52.1	13	16 15 43.05	0.343	20 43 43.6	1.39	6 48.4
14	16 17 22.01	0.610	20 41 17.4	0.96	8 47.9	14	16 15 51.68	0.375	20 44 17.8	1.46	6 44.6
15	16 17 7.72	0.580	20 40 55.1	0.89	8 43.7	15	16 16 1.06	0.407	20 44 53.8	1.54	6 40.9
16	16 16 54.16	−0.550	−20 40 34.6	+0.82	8 39.6	16	16 16 11.19	+0.439	−20 45 31.6	−1.62	6 37.1
17	16 16 41.34	0.519	20 40 15.9	0.75	8 35.4	17	16 16 22.07	0.470	20 46 11.2	1.69	6 33.3
18	16 16 29.26	0.488	20 39 59.0	0.67	8 31.3	18	16 16 33.71	0.501	20 46 52.5	1.76	6 29.6
19	16 16 17.92	0.457	20 39 44.0	0.59	8 27.2	19	16 16 46.10	0.532	20 47 35.6	1.83	6 25.9
20	16 16 7.33	0.426	20 39 30.8	0.51	8 23.1	20	16 16 59.23	0.563	20 48 20.4	1.90	6 22.2
21	16 15 57.49	−0.395	−20 39 19.5	+0.44	8 19.0	21	16 17 13.09	+0.593	−20 49 6.8	−1.97	6 18.5
22	16 15 48.41	0.363	20 39 10.0	0.36	8 14.9	22	16 17 27.68	0.623	20 49 54.9	2.04	6 14.8
23	16 15 40.08	0.331	20 39 2.4	0.28	8 10.8	23	16 17 43.00	0.653	20 50 44.7	2.11	6 11.1
24	16 15 32.52	0.299	20 38 56.7	0.20	8 6.8	24	16 17 59.04	0.683	20 51 36.1	2.17	6 7.4
25	16 15 25.73	0.267	20 38 52.9	0.12	8 2.8	25	16 18 15.79	0.713	20 52 29.0	2.24	6 3.8
26	16 15 19.70	−0.235	−20 38 51.0	+0.04	7 58.7	26	16 18 33.25	+0.742	−20 53 23.4	−2.30	6 0.1
27	16 15 14.44	0.203	20 38 51.0	−0.04	7 54.7	27	16 18 51.42	0.771	20 54 19.4	2.36	5 56.5
28	16 15 9.95	0.171	20 38 52.9	0.12	7 50.7	28	16 19 10.29	0.800	20 55 16.9	2.42	5 52.9
29	16 15 6.23	0.139	20 38 56.7	0.20	7 46.8	29	16 19 29.85	0.829	20 56 15.8	2.48	5 49.3
30	16 15 3.27	0.107	20 39 2.4	0.28	7 42.8	30	16 19 50.09	0.858	20 57 16.1	2.54	5 45.7
31	16 15 1.09	−0.075	−20 39 10.1	−0.36	7 38.8	31	16 20 11.02	+0.886	−20 58 17.9	−2.60	5 42.2
32	16 14 59.69	−0.043	−20 39 19.7	−0.44	7 34.9	32	16 20 32.63	+0.914	−20 59 21.0	−2.66	5 38.6

Day of the Month.	2d.	10th.	18th.	26th.	Day of the Month.	3d.	11th.	19th.	27th.
	″	″	″	″		″	″	″	″
Semidiameter	21.20	20.86	20.47	20.05	Semidiameter	19.60	19.14	18.69	18.25
Horizontal Parallax . .	1.98	1.95	1.91	1.87	Horizontal Parallax .	1.83	1.79	1.75	1.71

The sign + prefixed to the hourly change of declination indicates that south declinations are decreasing; the sign — indicates that south inclinations are increasing.

JUPITER, 1912.

GREENWICH MEAN TIME.

SEPTEMBER.						OCTOBER.					
Day of Month.	Apparent Right Ascension. Noon.	Var. of R. A. for 1 Hour. Noon.	Apparent Declination. Noon.	Var. of Decl. for 1 Hour. Noon.	Meridian Passage.	Day of Month.	Apparent Right Ascension. Noon.	Var. of R. A. for 1 Hour. Noon.	Apparent Declination. Noon.	Var. of Decl. for 1 Hour. Noon.	Meridian Passage.
	h m s	s	° ′ ″	″	h m		h m s	s	° ′ ″	″	h m
1	16 20 32.63	+0.914	−20 59 21.0	−2.66	5 38.6	1	16 36 10.40	+1.651	−21 38 52.4	−3.71	3 56.2
2	16 20 54.91	0.942	21 0 25.4	2.72	5 35.0	2	16 36 50.27	1.672	21 40 21.4	3.72	3 53.0
3	16 21 17.86	0.970	21 1 31.1	2.77	5 31.4	3	16 37 30.64	1.693	21 41 50.8	3.73	3 49.7
4	16 21 41.48	0.998	21 2 38.1	2.82	5 27.9	4	16 38 11.49	1.713	21 43 20.4	3.73	3 46.5
5	16 22 5.77	1.025	21 3 46.4	2.87	5 24.4	5	16 38 52.83	1.733	21 44 50.2	3.74	3 43.2
6	16 22 30.71	+1.052	−21 4 56.0	−2.92	5 20.9	6	16 39 34.65	+1.753	−21 46 20.1	−3.74	3 40.0
7	16 22 56.30	1.079	21 6 6.8	2.97	5 17.4	7	16 40 16.94	1.772	21 47 50.2	3.75	3 36.7
8	16 23 22.54	1.106	21 7 18.8	3.02	5 13.9	8	16 40 59.69	1.791	21 49 20.4	3.76	3 33.5
9	16 23 49.43	1.133	21 8 31.9	3.07	5 10.4	9	16 41 42.90	1.810	21 50 50.7	3.76	3 30.3
10	16 24 16.95	1.160	21 9 46.1	3.11	5 6.9	10	16 42 26.56	1.829	21 52 21.0	3.76	3 27.1
11	16 24 45.10	+1.186	−21 11 1.3	−3.16	5 3.4	11	16 43 10.66	+1.847	−21 53 51.3	−3.76	3 23.9
12	16 25 13.88	1.212	21 12 17.6	3.20	5 0.0	12	16 43 55.20	1.865	21 55 21.6	3.76	3 20.7
13	16 25 43.28	1.238	21 13 34.9	3.24	4 56.5	13	16 44 40.17	1.883	21 56 51.8	3.76	3 17.5
14	16 26 13.28	1.263	21 14 53.1	3.28	4 53.1	14	16 45 25.57	1.900	21 58 21.7	3.75	3 14.3
15	16 26 43.89	1.288	21 16 12.2	3.32	4 49.7	15	16 46 11.39	1.917	21 59 51.6	3.74	3 11.1
16	16 27 15.10	+1.313	−21 17 32.2	−3.35	4 46.3	16	16 46 57.61	+1.934	−22 1 21.3	−3.73	3 8.0
17	16 27 46.90	1.338	21 18 53.1	3.39	4 42.9	17	16 47 44.23	1.951	22 2 50.8	3.72	3 4.8
18	16 28 19.29	1.362	21 20 14.8	3.42	4 39.5	18	16 48 31.25	1.967	22 4 20.0	3.71	3 1.7
19	16 28 52.25	1.386	21 21 37.2	3.45	4 36.1	19	16 49 18.66	1.983	22 5 48.9	3.70	2 58.5
20	16 29 25.78	1.409	21 23 0.3	3.48	4 32.8	20	16 50 6.45	1.999	22 7 17.4	3.69	2 55.4
21	16 29 59.88	+1.432	−21 24 24.2	−3.51	4 29.4	21	16 50 54.62	+2.015	−22 8 45.6	−3.68	2 52.3
22	16 30 34.53	1.455	21 25 48.7	3.53	4 26.1	22	16 51 43.16	2.030	22 10 13.5	3.66	2 49.2
23	16 31 9.73	1.478	21 27 13.8	3.56	4 22.7	23	16 52 32.06	2.045	22 11 41.0	3.64	2 46.0
24	16 31 45.47	1.501	21 28 39.4	3.58	4 19.4	24	16 53 21.31	2.060	22 13 8.0	3.62	2 42.9
25	16 32 21.75	1.523	21 30 5.6	3.60	4 16.0	25	16 54 10.92	2.075	22 14 34.5	3.60	2 39.8
26	16 32 58.56	+1.545	−21 31 32.3	−3.62	4 12.7	26	16 55 0.88	+2.089	−22 16 0.5	−3.58	2 36.7
27	16 33 35.90	1.567	21 32 59.5	3.64	4 9.4	27	16 55 51.18	2.103	22 17 26.0	3.55	2 33.6
28	16 34 13.76	1.588	21 34 27.2	3.66	4 6.1	28	16 56 41.81	2.117	22 18 50.9	3.52	2 30.5
29	16 34 52.14	1.609	21 35 55.3	3.68	4 2.8	29	16 57 32.77	2.130	22 20 15.2	3.50	2 27.4
30	16 35 31.02	1.630	21 37 23.7	3.69	3 59.5	30	16 58 24.05	2.143	22 21 39.0	3.47	2 24.4
31	16 36 10.40	+1.651	−21 38 52.4	−3.71	3 56.2	31	16 59 15.66	+2.156	−22 23 2.1	−3.45	2 21.3
32	16 36 50.27	+1.672	−21 40 21.4	−3.72	3 53.0	32	17 0 7.57	+2.169	−22 24 24.5	−3.42	2 18.2

Day of the Month.	4th.	12th.	20th.	28th.	Day of the Month.	6th.	14th.	22d.	30th.
	″	″	″	″		″	″	″	″
Semidiameter	17.83	17.43	17.06	16.71	Semidiameter	16.40	16.12	15.87	15.66
Horizontal Parallax . .	1.67	1.63	1.59	1.56	Horizontal Parallax .	1.53	1.50	1.48	1.46

NOTE.—The sign + indicates north declinations; the sign − indicates south declinations.

GREENWICH MEAN TIME.

NOVEMBER.						DECEMBER.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.
	Noon.	*Noon.*	*Noon.*	*Noon.*			*Noon.*	*Noon.*	*Noon.*	*Noon.*	
	h m s	s	° ′ ″	″	h m		h m s	s	° ′ ″	″	h m
1	17 0 7.57	+2.169	−22 24 24.5	−3.42	2 18.2	1	17 28 0.01	+2.437	−22 58 25.3	−2.13	0 47.9
2	17 0 59.79	2.182	22 25 46.3	3.39	2 15.1	2	17 28 58.57	2.442	22 59 15.5	2.07	0 44.9
3	17 1 52.32	2.194	22 27 7.3	3.36	2 12.1	3	17 29 57.24	2.447	23 0 4.4	2.02	0 41.9
4	17 2 45.14	2.206	22 28 27.6	3.33	2 9.0	4	17 30 56.03	2.452	23 0 52.0	1.96	0 39.0
5	17 3 38.25	2.218	22 29 47.1	3.30	2 6.0	5	17 31 54.93	2.456	23 1 38.2	1.90	0 36.1
6	17 4 31.65	+2.230	−22 31 5.8	−3.27	2 2.9	6	17 32 53.93	+2.460	−23 2 23.1	−1.84	0 33.1
7	17 5 25.33	2.242	22 32 23.7	3.23	1 59.9	7	17 33 53.02	2.464	23 3 6.6	1.78	0 30.2
8	17 6 19.28	2.253	22 33 40.7	3.20	1 56.8	8	17 34 52.20	2.467	23 3 48.7	1.73	0 27.3
9	17 7 13.49	2.264	22 34 56.9	3.16	1 53.8	9	17 35 51.46	2.470	23 4 29.4	1.67	0 24.4
10	17 8 7.96	2.275	22 36 12.2	3.12	1 50.8	10	17 36 50.79	2.473	23 5 8.8	1.61	0 21.5
11	17 9 2.69	+2.286	−22 37 26.5	−3.08	1 47.8	11	17 37 50.19	+2.476	−23 5 46.7	−1.55	0 18.5
12	17 9 57.66	2.296	22 38 39.9	3.04	1 44.7	12	17 38 49.65	2.479	23 6 23.2	1.49	0 15.6
13	17 10 52.87	2.305	22 39 52.2	3.00	1 41.7	13	17 39 49.16	2.481	23 6 58.3	1.43	0 12.6
14	17 11 48.31	2.314	22 41 3.6	2.95	1 38.7	14	17 40 48.72	2.483	23 7 32.0	1.37	0 9.7
15	17 12 43.97	2.323	22 42 13.9	2.91	1 35.7	15	17 41 48.32	2.484	23 8 4.2	1.31	0 6.7
16	17 13 39.85	+2.332	−22 43 23.2	−2.86	1 32.7	16	17 42 47.95	+2.485	−23 8 35.0	−1.25	0 3.8
17	17 14 35.94	2.341	22 44 31.5	2.82	1 29.7	17	17 43 47.60	2.486	23 9 4.4	1.19	0 0.8 23 57.9
18	17 15 32.24	2.349	22 45 38.7	2.78	1 26.7	18	17 44 47.27	2.486	23 9 32.3	1.13	23 54.9
19	17 16 28.73	2.357	22 46 44.7	2.73	1 23.7	19	17 45 46.96	2.486	23 9 58.8	1.07	23 52.0
20	17 17 25.41	2.365	22 47 49.6	2.68	1 20.7	20	17 46 46.66	2.487	23 10 23.8	1.01	23 49.0
21	17 18 22.28	+2.373	−22 48 53.4	−2.63	1 17.7	21	17 47 46.35	+2.487	−23 10 47.4	−0.95	23 46.1
22	17 19 19.33	2.381	22 49 56.0	2.58	1 14.7	22	17 48 46.04	2.487	23 11 9.6	0.89	23 43.1
23	17 20 16.56	2.388	22 50 57.5	2.54	1 11.8	23	17 49 45.73	2.486	23 11 30.3	0.83	23 40.2
24	17 21 13.96	2.395	22 51 57.8	2.49	1 8.8	24	17 50 45.40	2.485	23 11 49.5	0.77	23 37.3
25	17 22 11.51	2.402	22 52 56.9	2.44	1 5.8	25	17 51 45.05	2.484	23 12 7.3	0.71	23 34.4
26	17 23 9.23	+2.408	−22 53 54.8	−2.38	1 2.8	26	17 52 44.68	+2.483	−23 12 23.7	−0.65	23 31.4
27	17 24 7.10	2.414	22 54 51.4	2.33	0 59.9	27	17 53 44.27	2.482	23 12 38.6	0.59	23 28.5
28	17 25 5.12	2.420	22 55 46.8	2.28	0 56.9	28	17 54 43.83	2.480	23 12 52.1	0.53	23 25.5
29	17 26 3.28	2.426	22 56 40.9	2.23	0 53.9	29	17 55 43.35	2.478	23 13 4.2	0.47	23 22.6
30	17 27 1.58	2.432	22 57 33.7	2.18	0 50.9	30	17 56 42.82	2.476	23 13 14.8	0.41	23 19.6
31	17 28 0.01	+2.437	−22 58 25.3	−2.13	0 47.9	31	17 57 42.23	+2.474	−23 13 24.0	−0.35	23 16.7
32	17 28 58.57	+2.442	−22 59 15.5	−2.07	0 44.9	32	17 58 41.59	+2.472	−23 13 31.7	−0.29	23 13.7

Day of the Month.	7th.	15th.	23d.	Day of the Month.	1st.	9th.	17th.	25th.	33d.
	″	″	″		″	″	″	″	″
Semidiameter	15.47	15.32	15.21	Semidiameter . .	15.13	15.08	15.07	15.09	15.15
Horizontal Parallax	1.44	1.43	1.42	Horizontal Par. .	1.41	1.41	1.41	1.41	1.42

The sign − prefixed to the hourly change of declination indicates that south declinations are increasing.

SATURN, 1912.

GREENWICH MEAN TIME.

JANUARY.						FEBRUARY.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
	h m s	s	° ′ ″	″	h m		h m s	s	° ′ ″	″	h m
1	2 47 7.01	−0.275	+13 36 36.2	−0.51	8 6.6	1	2 47 12.03	+0.291	+13 46 32.1	+2.09	6 4.9
2	2 47 0.65	0.257	13 36 24.9	0.43	8 2.6	2	2 47 19.22	0.309	13 47 23.1	2.17	6 1.1
3	2 46 54.69	0.240	13 36 15.6	0.35	7 58.6	3	2 47 26.83	0.327	13 48 15.9	2.25	5 57.3
4	2 46 49.15	0.222	13 36 8.3	0.27	7 54.6	4	2 47 34.86	0.344	13 49 10.5	2.32	5 53.5
5	2 46 44.04	0.204	13 36 3.1	0.18	7 50.6	5	2 47 43.32	0.361	13 50 7.0	2.39	5 49.7
6	2 46 39.36	−0.186	+13 35 59.9	−0.09	7 46.6	6	2 47 52.19	+0.379	+13 51 5.3	+2.47	5 45.9
7	2 46 35.11	0.168	13 35 58.7	−0.01	7 42.6	7	2 48 1.48	0.396	13 52 5.3	2.54	5 42.1
8	2 46 31.29	0.150	13 35 59.6	+0.08	7 38.6	8	2 48 11.19	0.413	13 53 7.1	2.62	5 38.3
9	2 46 27.90	0.132	13 36 2.5	0.16	7 34.6	9	2 48 21.31	0.430	13 54 10.6	2.69	5 34.5
10	2 46 24.95	0.113	13 36 7.4	0.25	7 30.6	10	2 48 31.83	0.447	13 55 15.9	2.76	5 30.7
11	2 46 22.44	−0.095	+13 36 14.4	+0.34	7 26.6	11	2 48 42.76	+0.464	+13 56 22.9	+2.83	5 27.0
12	2 46 20.37	0.076	13 36 23.5	0.43	7 22.6	12	2 48 54.11	0.481	13 57 31.5	2.90	5 23.3
13	2 46 18.74	0.058	13 36 34.6	0.52	7 18.7	13	2 49 5.86	0.498	13 58 41.8	2.97	5 19.6
14	2 46 17.55	0.040	13 36 47.8	0.61	7 14.7	14	2 49 18.01	0.515	13 59 53.8	3.04	5 15.8
15	2 46 16.80	0.022	13 37 3.1	0.69	7 10.8	15	2 49 30.55	0.531	14 1 7.4	3.10	5 12.1
16	2 46 16.49	−0.004	+13 37 20.4	+0.77	7 6.8	16	2 49 43.49	+0.547	+14 2 22.6	+3.17	5 8.4
17	2 46 16.63	+0.015	13 37 39.8	0.86	7 2.9	17	2 49 56.82	0.563	14 3 39.4	3.24	5 4.7
18	2 46 17.22	0.034	13 38 1.2	0.94	6 59.0	18	2 50 10.54	0.579	14 4 57.8	3.30	5 1.0
19	2 46 18.26	0.052	13 38 24.7	1.03	6 55.1	19	2 50 24.64	0.595	14 6 17.7	3.36	4 57.3
20	2 46 19.74	0.071	13 38 50.2	1.11	6 51.2	20	2 50 39.12	0.611	14 7 39.1	3.42	4 53.6
21	2 46 21.66	+0.089	+13 39 17.8	+1.19	6 47.3	21	2 50 53.98	+0.627	+14 9 2.0	+3.48	4 49.9
22	2 46 24.03	0.108	13 39 47.4	1.28	6 43.4	22	2 51 9.22	0.643	14 10 26.4	3.54	4 46.2
23	2 46 26.85	0.127	13 40 19.1	1.36	6 39.5	23	2 51 24.82	0.658	14 11 52.2	3.60	4 42.5
24	2 46 30.12	0.145	13 40 52.8	1.45	6 35.6	24	2 51 40.78	0.673	14 13 19.3	3.66	4 38.9
25	2 46 33.83	0.164	13 41 28.4	1.53	6 31.8	25	2 51 57.10	0.688	14 14 47.8	3.72	4 35.3
26	2 46 37.98	+0.182	+13 42 5.9	+1.61	6 27.9	26	2 52 13.78	+0.702	+14 16 17.7	+3.78	4 31.6
27	2 46 42.57	0.201	13 42 45.4	1.69	6 24.1	27	2 52 30.82	0.717	14 17 48.9	3.83	4 28.0
28	2 46 47.59	0.219	13 43 26.9	1.77	6 20.2	28	2 52 48.20	0.731	14 19 21.3	3.88	4 24.3
29	2 46 53.04	0.237	13 44 10.4	1.85	6 16.3	29	2 53 5.93	0.745	14 20 55.0	3.93	4 20.7
30	2 46 58.93	0.255	13 44 55.8	1.93	6 12.5	30	2 53 23.99	0.759	14 22 29.9	3.98	4 17.0
31	2 47 5.26	+0.273	+13 45 43.0	+2.01	6 8.7	31	2 53 42.38	+0.773	+14 24 6.0	+4.03	4 13.4
32	2 47 12.03	+0.291	+13 46 32.1	+2.09	6 4.9	32	2 54 1.11	+0.787	+14 25 43.3	+4.07	4 9.8

Day of the Month.	0	8th.	16th.	24th.	Day of the Month.	1st.	9th.	17th.	25th.
	″	″	″	″		″	″	″	″
Semidiameter	9.06	8.96	8.83	8.69	Semidiameter	8.57	8.45	8.33	8.21
Horizontal Parallax . .	1.03	1.02	1.00	0.99	Horizontal Parallax . .	0.97	0.96	0.95	0.93

NOTE.—The sign + indicates north declinations; the sign — indicates south declinations.

GREENWICH MEAN TIME.

MARCH.						APRIL.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.
	Noon.	*Noon.*	*Noon.*	*Noon.*			*Noon.*	*Noon.*	*Noon.*	*Noon.*	
	h m s	s	° ′ ″	″	h m		h m s	s	° ′ ″	″	h m
1	2 53 23.99	+0.759	+14 22 29.9	+3.98	4 17.0	1	3 5 10.33	+1.110	+15 19 27.6	+5.03	2 26.9
2	2 53 42.38	0.773	14 24 6.0	4.03	4 13.4	2	3 5 37.07	1.119	15 21 28.5	5.05	2 23.4
3	2 54 1.11	0.787	14 25 43.3	4.07	4 9.8	3	3 6 4.01	1.127	15 23 29.7	5.06	2 19.9
4	2 54 20.17	0.801	14 27 21.8	4.12	4 6.2	4	3 6 31.15	1.135	15 25 31.3	5.08	2 16.4
5	2 54 39.55	0.814	14 29 1.5	4.17	4 2.6	5	3 6 58.47	1.143	15 27 33.2	5.09	2 13.0
6	2 54 59.25	+0.827	+14 30 42.3	+4.22	3 59.0	6	3 7 25.98	+1.151	+15 29 35.5	+5.10	2 9.5
7	2 55 19.26	0.840	14 32 24.2	4.27	3 55.4	7	3 7 53.67	1.158	15 31 38.1	5.11	2 6.0
8	2 55 39.59	0.853	14 34 7.0	4.31	3 51.8	8	3 8 21.53	1.165	15 33 40.9	5.12	2 2.5
9	2 56 0.23	0.866	14 35 50.9	4.35	3 48.2	9	3 8 49.58	1.172	15 35 44.0	5.13	1 59.1
10	2 56 21.17	0.878	14 37 35.9	4.39	3 44.6	10	3 9 17.79	1.179	15 37 47.3	5.14	1 55.6
11	2 56 42.41	+0.891	+14 39 21.9	+4.43	3 41.0	11	3 9 46.17	+1.186	+15 39 50.8	+5.15	1 52.2
12	2 57 3.95	0.903	14 41 8.7	4.47	3 37.5	12	3 10 14.71	1.193	15 41 54.5	5.15	1 48.7
13	2 57 25.79	0.915	14 42 56.6	4.51	3 33.9	13	3 10 43.41	1.199	15 43 58.3	5.16	1 45.3
14	2 57 47.91	0.927	14 44 45.4	4.55	3 30.4	14	3 11 12.27	1.205	15 46 2.3	5.17	1 41.8
15	2 58 10.31	0.939	14 46 35.0	4.59	3 26.8	15	3 11 41.27	1.211	15 48 6.4	5.17	1 38.4
16	2 58 32.99	+0.951	+14 48 25.5	+4.62	3 23.3	16	3 12 10.41	+1.217	+15 50 10.6	+5.17	1 34.9
17	2 58 55.95	0.962	14 50 16.9	4.66	3 19.7	17	3 12 39.69	1.223	15 52 14.8	5.18	1 31.5
18	2 59 19.18	0.973	14 52 9.0	4.69	3 16.2	18	3 13 9.11	1.229	15 54 19.1	5.18	1 28.0
19	2 59 42.68	0.984	14 54 1.9	4.72	3 12.6	19	3 13 38.65	1.234	15 56 23.4	5.17	1 24.6
20	3 0 6.45	0.995	14 55 55.6	4.75	3 9.1	20	3 14 8.31	1.239	15 58 27.6	5.17	1 21.1
21	3 0 30.48	+1.005	+14 57 50.0	+4.78	3 5.5	21	3 14 38.10	+1.244	+16 0 31.8	+5.17	1 17.7
22	3 0 54.75	1.016	14 59 45.0	4.81	3 2.0	22	3 15 8.01	1.249	16 2 36.0	5.17	1 14.2
23	3 1 19.27	1.026	15 1 40.7	4.84	2 58.4	23	3 15 38.02	1.253	16 4 40.1	5.16	1 10.8
24	3 1 44.03	1.036	15 3 37.1	4.87	2 54.9	24	3 16 8.13	1.257	16 6 44.1	5.16	1 7.3
25	3 2 9.03	1.046	15 5 34.1	4.89	2 51.4	25	3 16 38.35	1.261	16 8 47.9	5.16	1 3.9
26	3 2 34.27	+1.056	+15 7 31.6	+4.92	2 47.9	26	3 17 8.66	+1.265	+16 10 51.6	+5.15	1 0.4
27	3 2 59.74	1.066	15 9 29.7	4.94	2 44.4	27	3 17 39.06	1.269	16 12 55.1	5.15	0 57.0
28	3 3 25.43	1.075	15 11 28.4	4.96	2 40.9	28	3 18 9.55	1.272	16 14 58.4	5.14	0 53.6
29	3 3 51.34	1.084	15 13 27.6	4.98	2 37.4	29	3 18 40.13	1.275	16 17 1.6	5.13	0 50.2
30	3 4 17.46	1.093	15 15 27.2	5.00	2 33.9	30	3 19 10.78	1.278	16 19 4.6	5.12	0 46.7
31	3 4 43.79	+1.102	+15 17 27.2	+5.01	2 30.4	31	3 19 41.50	+1.281	+16 21 7.3	+5.11	0 43.3
32	3 5 10.33	+1.110	+15 19 27.6	+5.03	2 26.9	32	3 20 12.29	+1.284	+16 23 9.7	+5.10	0 39.9

Day of the Month.	4th.	12th.	20th.	28th.	Day of the Month.	5th.	13th.	21st.	29th.
	″	″	″	″		″	″	″	″
Semidiameter	8.11	8.02	7.93	7.86	Semidiameter	7.79	7.74	7.70	7.67
Horizontal Parallax . .	0.92	0.91	0.90	0.89	Horizontal Parallax . .	0.88	0.88	0.87	0.87

The sign + prefixed to the hourly change of declination indicates that north declinations are increasing.

SATURN, 1912.

GREENWICH MEAN TIME.

MAY.						JUNE.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.
	Noon.	*Noon.*	*Noon.*	*Noon.*			*Noon.*	*Noon.*	*Noon.*	*Noon.*	
	h m s	s	° ′ ″	″	h m		h m s	s	° ′ ″	″	h m
1	3 19 41.50	+1.281	+16 21 7.3	+5.11	0 43.3	1	3 35 48.41	+1.288	+17 20 59.8	+4.44	22 54.2
2	3 20 12.29	1.284	16 23 9.7	5.10	0 39.9	2	3 36 19.28	1.285	17 22 46.0	4.41	22 50.8
3	3 20 43.16	1.287	16 25 11.9	5.09	0 36.5	3	3 36 50.09	1.282	17 24 31.5	4.38	22 47.3
4	3 21 14.10	1.290	16 27 13.8	5.08	0 33.1	4	3 37 20.84	1.279	17 26 16.2	4.35	22 43.9
5	3 21 45.09	1.293	16 29 15.4	5.06	0 29.7	5	3 37 51.51	1.276	17 28 0.2	4.32	22 40.5
6	3 22 16.13	+1.295	+16 31 16.7	+5.05	0 26.3	6	3 38 22.10	+1.273	+17 29 43.4	+4.29	22 37.1
7	3 22 47.23	1.297	16 33 17.6	5.03	0 22.9	7	3 38 52.61	1.269	17 31 25.8	4.26	22 33.6
8	3 23 18.37	1.299	16 35 18.2	5.02	0 19.4	8	3 39 23.03	1.266	17 33 7.3	4.22	22 30.2
9	3 23 49.56	1.301	16 37 18.4	5.00	0 16.0	9	3 39 53.36	1.262	17 34 48.0	4.18	22 26.8
10	3 24 20.79	1.302	16 39 18.2	4.98	0 12.6	10	3 40 23.59	1.258	17 36 27.9	4.15	22 23.4
11	3 24 52.05	+1.303	+16 41 17.6	+4.97	0 9.2	11	3 40 53.72	+1.254	+17 38 7.0	+4.11	22 19.9
12	3 25 23.34	1.304	16 43 16.6	4.95	0 5.8	12	3 41 23.75	1.249	17 39 45.3	4.08	22 16.5
13	3 25 54.66	1.305	16 45 15.1	4.93	0 2.4 23 59.0	13	3 41 53.67	1.244	17 41 22.6	4.04	22 13.0
14	3 26 26.00	1.306	16 47 13.1	4.91	23 55.6	14	3 42 23.47	1.239	17 42 59.0	4.00	22 9.6
15	3 26 57.36	1.307	16 49 10.7	4.89	23 52.2	15	3 42 53.15	1.234	17 44 34.6	3.97	22 6.1
16	3 27 28.73	+1.307	+16 51 7.8	+4.87	23 48.8	16	3 43 22.70	+1.229	+17 46 9.4	+3.93	22 2.7
17	3 28 0.10	1.308	16 53 4.4	4.85	23 45.4	17	3 43 52.12	1.223	17 47 43.3	3.89	21 59.2
18	3 28 31.48	1.308	16 55 0.4	4.83	23 41.9	18	3 44 21.42	1.218	17 49 16.1	3.85	21 55.8
19	3 29 2.85	1.307	16 56 55.9	4.80	23 38.5	19	3 44 50.57	1.212	17 50 48.0	3.81	21 52.3
20	3 29 34.21	1.307	16 58 50.8	4.77	23 35.1	20	3 45 19.58	1.206	17 52 18.9	3.77	21 48.9
21	3 30 5.56	+1.306	+17 0 45.1	+4.75	23 31.7	21	3 45 48.44	+1.199	+17 53 48.9	+3.73	21 45.4
22	3 30 36.90	1.305	17 2 38.8	4.72	23 28.3	22	3 46 17.15	1.193	17 55 17.9	3.69	21 42.0
23	3 31 8.22	1.304	17 4 31.9	4.70	23 24.9	23	3 46 45.70	1.186	17 56 45.9	3.65	21 38.5
24	3 31 39.51	1.303	17 6 24.4	4.67	23 21.5	24	3 47 14.09	1.180	17 58 13.0	3.61	21 35.1
25	3 32 10.77	1.302	17 8 16.2	4.64	23 18.1	25	3 47 42.32	1.173	17 59 39.1	3.57	21 31.6
26	3 32 41.99	+1.300	+17 10 7.3	+4.62	23 14.6	26	3 48 10.37	+1.166	+18 1 4.2	+3.53	21 28.1
27	3 33 13.18	1.298	17 11 57.8	4.59	23 11.2	27	3 48 38.25	1.159	18 2 28.3	3.49	21 24.6
28	3 33 44.33	1.296	17 13 47.6	4.56	23 7.8	28	3 49 5.96	1.151	18 3 51.4	3.45	21 21.2
29	3 34 15.43	1.294	17 15 36.7	4.53	23 4.4	29	3 49 33.48	1.143	18 5 13.5	3.40	21 17.7
30	3 34 46.48	1.292	17 17 25.1	4.50	23 1.0	30	3 50 0.82	1.135	18 6 34.6	3.36	21 14.2
31	3 35 17.47	+1.290	+17 19 12.8	+4.47	22 57.6	31	3 50 27.97	+1.127	+18 7 54.7	+3.32	21 10.7
32	3 35 48.41	+1.288	+17 20 59.8	+4.44	22 54.2	32	3 50 54.93	+1.119	+18 9 13.7	+3.28	21 7.3

Day of the Month.	7th.	15th.	23d.	31st.	Day of the Month.	8th.	16th.	24th.
	″	″	″	″		″	″	″
Semidiameter	7.65	7.65	7.66	7.69	Semidiameter	7.71	7.75	7.80
Horizontal Parallax . .	0.87	0.87	0.87	0.87	Horizontal Parallax	0.88	0.88	0.89

NOTE.—The sign + indicates north declinations; the sign − indicates south declinations.

SATURN, 1912.

GREENWICH MEAN TIME.

JULY.						AUGUST.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.
	Noon.	*Noon.*	*Noon.*	*Noon.*			*Noon.*	*Noon.*	*Noon.*	*Noon.*	
	h m s	s	° ′ ″	″	h m		h m s	s	° ′ ″	″	h m
1	3 50 27.97	+1.127	+18 7 54.7	+3.32	21 10.7	1	4 2 30.84	+0.787	+18 40 15.5	+1.87	19 20.7
2	3 50 54.93	1.119	18 9 13.7	3.28	21 7.3	2	4 2 49.54	0.773	18 40 59.8	1.82	19 17.1
3	3 51 21.68	1.111	18 10 31.7	3.24	21 3.8	3	4 3 7.91	0.759	18 41 42.9	1.77	19 13.5
4	3 51 48.23	1.102	18 11 48.7	3.19	21 0.3	4	4 3 25.95	0.745	18 42 24.9	1.72	19 9.8
5	3 52 14.58	1.093	18 13 4.6	3.15	20 56.8	5	4 3 43.64	0.730	18 43 5.7	1.67	19 6.2
6	3 52 40.73	+1.084	+18 14 19.5	+3.10	20 53.3	6	4 4 0.98	+0.715	+18 43 45.3	+1.62	19 2.5
7	3 53 6.66	1.075	18 15 33.3	3.06	20 49.8	7	4 4 17.97	0.701	18 44 23.7	1.57	18 58.9
8	3 53 32.37	1.066	18 16 46.0	3.01	20 46.3	8	4 4 34.61	0.686	18 45 0.9	1.52	18 55.2
9	3 53 57.84	1.057	18 17 57.7	2.96	20 42.7	9	4 4 50.88	0.671	18 45 36.9	1.47	18 51.6
10	3 54 23.08	1.047	18 19 8.3	2.92	20 39.2	10	4 5 6.79	0.656	18 46 11.7	1.42	18 47.9
11	3 54 48.09	+1.037	+18 20 17.8	+2.87	20 35.7	11	4 5 22.34	+0.640	+18 46 45.3	+1.37	18 44.2
12	3 55 12.86	1.027	18 21 26.2	2.83	20 32.1	12	4 5 37.51	0.624	18 47 17.7	1.32	18 40.5
13	3 55 37.39	1.017	18 22 33.5	2.78	20 28.6	13	4 5 52.30	0.608	18 47 48.8	1.27	18 36.8
14	3 56 1.68	1.006	18 23 39.6	2.73	20 25.1	14	4 6 6.70	0.592	18 48 18.7	1.22	18 33.1
15	3 56 25.70	0.995	18 24 44.6	2.69	20 21.5	15	4 6 20.72	0.576	18 48 47.5	1.17	18 29.4
16	3 56 49.46	+0.984	+18 25 48.5	+2.64	20 18.0	16	4 6 34.36	+0.560	+18 49 15.1	+1.12	18 25.7
17	3 57 12.96	0.973	18 26 51.3	2.60	20 14.5	17	4 6 47.60	0.544	18 49 41.4	1.07	18 22.0
18	3 57 36.19	0.962	18 27 53.0	2.55	20 10.9	18	4 7 0.44	0.527	18 50 6.5	1.02	18 18.2
19	3 57 59.15	0.951	18 28 53.5	2.50	20 7.4	19	4 7 12.88	0.510	18 50 30.4	0.97	18 14.5
20	3 58 21.83	0.939	18 29 52.9	2.46	20 3.8	20	4 7 24.93	0.493	18 50 53.1	0.92	18 10.8
21	3 58 44.22	+0.927	+18 30 51.1	+2.41	20 0.2	21	4 7 36.57	+0.476	+18 51 14.5	+0.87	18 7.1
22	3 59 6.33	0.915	18 31 48.2	2.36	19 56.6	22	4 7 47.80	0.459	18 51 34.8	0.82	18 3.3
23	3 59 28.15	0.903	18 32 44.2	2.31	19 53.0	23	4 7 58.62	0.442	18 51 53.9	0.77	17 59.6
24	3 59 49.67	0.891	18 33 39.0	2.26	19 49.4	24	4 8 9.03	0.425	18 52 11.8	0.72	17 55.8
25	4 0 10.90	0.879	18 34 32.6	2.22	19 45.9	25	4 8 19.03	0.408	18 52 28.4	0.67	17 52.0
26	4 0 31.83	+0.866	+18 35 25.1	+2.17	19 42.3	26	4 8 28.61	+0.391	+18 52 43.9	+0.62	17 48.2
27	4 0 52.46	0.853	18 36 16.4	2.12	19 38.7	27	4 8 37.78	0.373	18 52 58.2	0.57	17 44.4
28	4 1 12.77	0.840	18 37 6.6	2.07	19 35.1	28	4 8 46.52	0.355	18 53 11.3	0.52	17 40.6
29	4 1 32.77	0.827	18 37 55.6	2.02	19 31.5	29	4 8 54.83	0.337	18 53 23.2	0.47	17 36.8
30	4 1 52.45	0.814	18 38 43.4	1.97	19 27.9	30	4 9 2.72	0.319	18 53 33.9	0.42	17 33.0
31	4 2 11.81	+0.801	+18 39 30.0	+1.92	19 24.3	31	4 9 10.18	+0.301	+18 53 43.3	+0.37	17 29.2
32	4 2 30.84	+0.787	+18 40 15.5	+1.87	19 20.7	32	4 9 17.21	+0.283	+18 53 51.6	+0.32	17 25.4

Day of the Month.	2d.	10th.	18th.	26th.	Day of the Month.	3d.	11th.	19th.	27th.
	″	″	″	″		″	″	″	″
Semidiameter	7.86	7.94	8.03	8.12	Semidiameter	8.22	8.34	8.45	8.57
Horizontal Parallax . .	0.89	0.90	0.91	0.92	Horizontal Parallax . .	0.93	0.95	0.96	0.97

The sign + prefixed to the hourly change of declination indicates that north declinations are increasing.

SATURN, 1912.

GREENWICH MEAN TIME.

SEPTEMBER.						OCTOBER.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.
	Noon.	*Noon.*	*Noon.*	*Noon.*			*Noon.*	*Noon.*	*Noon.*	*Noon.*	
	h m s	s	° ′ ″	″	h m		h m s	s	° ′ ″	″	h m
1	4 9 17.21	+0.283	+18 53 51.6	+0.32	17 25.4	1	4 9 19.47	−0.276	+18 48 53.9	−1.12	15 27.3
2	4 9 23.80	0.265	18 53 58.7	0.27	17 21.6	2	4 9 12.62	0.294	18 48 26.6	1.16	15 23.3
3	4 9 29.95	0.247	18 54 4.6	0.22	17 17.7	3	4 9 5.34	0.312	18 47 58.3	1.21	15 19.2
4	4 9 35.66	0.229	18 54 9.3	0.17	17 13.9	4	4 8 57.63	0.330	18 47 29.0	1.25	15 15.2
5	4 9 40.93	0.211	18 54 12.8	0.12	17 10.0	5	4 8 49.49	0.348	18 46 58.6	1.29	15 11.1
6	4 9 45.75	+0.192	+18 54 15.1	+0.07	17 6.2	6	4 8 40.93	−0.366	+18 46 27.2	−1.33	15 7.0
7	4 9 50.12	0.173	18 54 16.2	+0.02	17 2.3	7	4 8 31.95	0.383	18 45 54.7	1.37	15 2.9
8	4 9 54.04	0.155	18 54 16.0	−0.03	16 58.5	8	4 8 22.56	0.400	18 45 21.3	1.41	14 58.8
9	4 9 57.51	0.136	18 54 14.7	0.08	16 54.6	9	4 8 12.75	0.417	18 44 46.9	1.45	14 54.7
10	4 10 0.53	0.117	18 54 12.2	0.13	16 50.7	10	4 8 2.53	0.434	18 44 11.6	1.49	14 50.6
11	4 10 3.10	+0.098	+18 54 8.5	−0.18	16 46.8	11	4 7 51.91	−0.451	+18 43 35.3	−1.53	14 46.5
12	4 10 5.22	0.079	18 54 3.5	0.23	16 42.9	12	4 7 40.90	0.467	18 42 58.0	1.57	14 42.4
13	4 10 6.87	0.060	18 53 57.4	0.28	16 39.0	13	4 7 29.49	0.483	18 42 19.8	1.61	14 38.2
14	4 10 8.07	0.041	18 53 50.2	0.33	16 35.1	14	4 7 17.70	0.499	18 41 40.8	1.65	14 34.1
15	4 10 8.82	0.022	18 53 41.8	0.38	16 31.1	15	4 7 5.53	0.515	18 41 0.9	1.68	14 30.0
16	4 10 9.11	+0.003	+18 53 32.2	−0.43	16 27.2	16	4 6 52.99	−0.530	+18 40 20.1	−1.72	14 25.9
17	4 10 8.95	−0.016	18 53 21.5	0.47	16 23.2	17	4 6 40.09	0.545	18 39 38.4	1.75	14 21.7
18	4 10 8.33	0.035	18 53 9.7	0.52	16 19.3	18	4 6 26.83	0.560	18 38 55.9	1.79	14 17.6
19	4 10 7.26	0.054	18 52 56.7	0.57	16 15.3	19	4 6 13.22	0.575	18 38 12.6	1.82	14 13.5
20	4 10 5.74	0.073	18 52 42.5	0.61	16 11.4	20	4 5 59.26	0.589	18 37 28.5	1.86	14 9.3
21	4 10 3.77	−0.092	+18 52 27.2	−0.66	16 7.4	21	4 5 44.96	−0.603	+18 36 43.6	−1.89	14 5.0
22	4 10 1.35	0.110	18 52 10.8	0.70	16 3.4	22	4 5 30.33	0.616	18 35 58.0	1.92	14 0.9
23	4 9 58.48	0.129	18 51 53.3	0.75	15 59.4	23	4 5 15.38	0.630	18 35 11.6	1.95	13 56.7
24	4 9 55.15	0.148	18 51 34.7	0.80	15 55.4	24	4 5 0.12	0.643	18 34 24.5	1.98	13 52.5
25	4 9 51.38	0.167	18 51 15.0	0.84	15 51.4	25	4 4 44.55	0.655	18 33 36.7	2.01	13 48.3
26	4 9 47.17	−0.185	+18 50 54.2	−0.89	15 47.4	26	4 4 28.68	−0.667	+18 32 48.2	−2.04	13 44.1
27	4 9 42.51	0.203	18 50 32.3	0.94	15 43.4	27	4 4 12.52	0.679	18 31 59.1	2.06	13 39.9
28	4 9 37.41	0.222	18 50 9.3	0.98	15 39.4	28	4 3 56.07	0.691	18 31 9.3	2.09	13 35.7
29	4 9 31.87	0.240	18 49 45.2	1.03	15 35.4	29	4 3 39.35	0.702	18 30 18.9	2.12	13 31.5
30	4 9 25.89	0.258	18 49 20.1	1.07	15 31.3	30	4 3 22.36	0.713	18 29 27.9	2.14	13 27.3
31	4 9 19.47	−0.276	+18 48 53.9	−1.12	15 27.3	31	4 3 5.11	−0.724	+18 28 36.3	−2.16	13 23.1
32	4 9 12.62	−0.294	+18 48 26.6	−1.16	15 23.3	32	4 2 47.62	−0.734	+18 27 44.2	−2.18	13 18.8

Day of the Month.	4th.	12th.	20th.	28th.	Day of the Month.	6th.	14th.	22d.	30th.
	″	″	″	″		″	″	″	″
Semidiameter	8.70	8.83	8.96	9.08	Semidiameter	9.20	9.30	9.39	9.47
Horizontal Parallax .	0.98	1.00	1.02	1.03	Horizontal Parallax . .	1.04	1.06	1.07	1.07

NOTE.—The sign + indicates north declinations; the sign — indicates south declinations.

GREENWICH MEAN TIME.

NOVEMBER.						DECEMBER.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.
	Noon.	*Noon.*	*Noon.*	*Noon.*			*Noon.*	*Noon.*	*Noon.*	*Noon.*	
	h m s	s	° ′ ″	″	h m		h m s	s	° ′ ″	″	h m
1	4 2 47.62	−0.734	+18 27 44.2	−2.18	13 18.8	1	3 52 58.93	−0.831	+17 59 53.1	−2.26	11 11.0
2	4 2 29.89	0.744	18 26 51.6	2.20	13 14.6	2	3 52 39.05	0.827	17 58 59.2	2.24	11 6.7
3	4 2 11.91	0.753	18 25 58.4	2.22	13 10.4	3	3 52 19.27	0.822	17 58 5.7	2.22	11 2.5
4	4 1 53.71	0.762	18 25 4.7	2.24	13 6.2	4	3 51 59.60	0.817	17 57 12.7	2.20	10 58.3
5	4 1 35.31	0.771	18 24 10.7	2.26	13 1.9	5	3 51 40.06	0.811	17 56 20.3	2.18	10 54.1
6	4 1 16.70	−0.779	+18 23 16.3	−2.28	12 57.6	6	3 51 20.66	−0.805	+17 55 28.4	−2.15	10 49.8
7	4 0 57.90	0.787	18 22 21.6	2.29	12 53.4	7	3 51 1.41	0.799	17 54 37.2	2.12	10 45.6
8	4 0 38.92	0.794	18 21 26.5	2.31	12 49.2	8	3 50 42.32	0.792	17 53 46.7	2.09	10 41.3
9	4 0 19.77	0.801	18 20 30.9	2.32	12 44.9	9	3 50 23.40	0.784	17 52 56.8	2.06	10 37.1
10	4 0 0.46	0.808	18 19 34.8	2.33	12 40.7	10	3 50 4.67	0.776	17 52 7.7	2.03	10 32.8
11	3 59 41.01	−0.814	+18 18 38.6	−2.34	12 36.5	11	3 49 46.14	−0.768	+17 51 19.4	−2.00	10 28.6
12	3 59 21.42	0.819	18 17 42.3	2.35	12 32.2	12	3 49 27.81	0.759	17 50 31.9	1.97	10 24.3
13	3 59 1.71	0.824	18 16 45.8	2.35	12 27.9	13	3 49 9.70	0.750	17 49 45.2	1.93	10 20.1
14	3 58 41.89	0.828	18 15 49.2	2.36	12 23.6	14	3 48 51.81	0.740	17 48 59.4	1.89	10 15.8
15	3 58 21.97	0.832	18 14 52.4	2.36	12 19.4	15	3 48 34.16	0.730	17 48 14.4	1.85	10 11.6
16	3 58 1.96	−0.835	+18 13 55.5	−2.37	12 15.2	16	3 48 16.76	−0.720	+17 47 30.4	−1.81	10 7.4
17	3 57 41.87	0.838	18 12 58.5	2.37	12 10.9	17	3 47 59.61	0.709	17 46 47.4	1.77	10 3.2
18	3 57 21.72	0.840	18 12 1.5	2.37	12 6.5	18	3 47 42.72	0.698	17 46 5.4	1.73	9 59.0
19	3 57 1.51	0.842	18 11 4.6	2.36	12 2.2	19	3 47 26.11	0.686	17 45 24.4	1.69	9 54.8
20	3 56 41.26	0.844	18 10 7.7	2.36	11 58.0	20	3 47 9.79	0.674	17 44 44.4	1.65	9 50.6
21	3 56 20.98	−0.845	+18 9 10.8	−2.36	11 53.8	21	3 46 53.76	−0.662	+17 44 5.4	−1.60	9 46.4
22	3 56 0.68	0.846	18 8 14.0	2.35	11 49.5	22	3 46 38.03	0.649	17 43 27.6	1.56	9 42.2
23	3 55 40.37	0.846	18 7 17.4	2.35	11 45.2	23	3 46 22.61	0.636	17 42 50.9	1.51	9 38.0
24	3 55 20.07	0.846	18 6 21.0	2.34	11 41.0	24	3 46 7.50	0.623	17 42 15.4	1.46	9 33.8
25	3 54 59.78	0.845	18 5 24.7	2.34	11 36.7	25	3 45 52.70	0.609	17 41 41.0	1.41	9 29.7
26	3 54 39.51	−0.844	+18 4 28.7	−2.33	11 32.4	26	3 45 38.24	−0.595	+17 41 7.8	−1.36	9 25.5
27	3 54 19.28	0.842	18 3 32.9	2.32	11 28.1	27	3 45 24.12	0.581	17 40 35.8	1.31	9 21.4
28	3 53 59.10	0.840	18 2 37.4	2.31	11 23.8	28	3 45 10.34	0.567	17 40 5.1	1.26	9 17.2
29	3 53 38.97	0.837	18 1 42.2	2.29	11 19.6	29	3 44 56.91	0.552	17 39 35.6	1.20	9 13.0
30	3 53 18.91	0.834	18 0 47.4	2.28	11 15.3	30	3 44 43.84	0.537	17 39 7.4	1.15	9 8.9
31	3 52 58.93	−0.831	+17 59 53.1	−2.26	11 11.0	31	3 44 31.13	−0.521	+17 38 40.5	−1.09	9 4.7
32	3 52 39.05	−0.827	+17 58 59.2	−2.24	11 6.7	32	3 44 18.80	−0.506	+17 38 15.0	−1.04	9 0.6

Day of the Month.	7th.	15th.	23d.	Day of the Month.	1st.	9th.	17th.	25th.	33d.
	″	″	″		″	″	″	″	″
Semidiameter	9.53	9.57	9.58	Semidiameter . .	9.56	9.53	9.47	9.39	9.29
Horizontal Parallax	1.08	1.09	1.09	Horizontal Par. .	1.09	1.08	1.07	1.07	1.06

The sign — prefixed to the hourly change of declination indicates that north declinations are decreasing.

URANUS, 1912.

GREENWICH MEAN TIME.

Month and Day.	Apparent Right Ascension.	Var. of R. A. for 1 Day.	Apparent Declination.	Var. of Decl. for 1 Day.	Meridian Passage.	Month and Day.	Apparent Right Ascension.	Var. of R. A. for 1 Day.	Apparent Declination.	Var. of Decl. for 1 Day.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
	h m s	s	° ′ ″	″	h m		h m s	s	° ′ ″	″	h m
Jan. 0	20 1 47.08	+14.183	−21 2 40.3	+41.05	1 26.4	July 2	20 19 2.58	− 8.942	−20 13 55.8	−30.47	13 36.1
4	20 2 44.26	14.402	20 59 54.3	41.90	1 11.6	6	20 18 26.13	9.274	20 15 59.4	31.30	13 19.7
8	20 3 42.23	14.574	20 57 5.3	42.64	0 56.8	10	20 17 48.47	9.548	20 18 5.9	31.92	13 3.4
12	20 4 40.79	14.696	20 54 13.5	43.22	0 42.1	14	20 17 9.83	9.757	20 20 14.5	32.32	12 47.0
16	20 5 39.75	14.776	20 51 19.7	43.66	0 27.3	18	20 16 30.50	9.897	20 22 24.2	32.49	12 30.6
20	20 6 38.93	+14.802	−20 48 24.4	+43.95	0 12.6	22	20 15 50.74	− 9.972	−20 24 34.2	−32.44	12 14.3
24	20 7 38.09	14.770	20 45 28.3	44.10	23 54.2	26	20 15 10.81	9.982	20 26 43.6	32.18	11 57.9
28	20 8 37.00	14.682	20 42 31.9	44.08	23 39.4	30	20 14 30.97	9.930	20 28 51.5	31.72	11 41.5
Feb. 1	20 9 35.48	14.551	20 39 35.9	43.90	23 24.6	Aug. 3	20 13 51.46	9.811	20 30 57.1	31.07	11 25.1
5	20 10 33.35	14.375	20 36 40.9	43.58	23 9.8	7	20 13 12.56	9.629	20 32 59.7	30.21	11 8.7
9	20 11 30.42	+14.153	−20 33 47.5	+43.09	22 55.1	11	20 12 34.50	− 9.383	−20 34 58.6	−29.15	10 52.4
13	20 12 26.51	13.884	20 30 56.4	42.44	22 40.3	15	20 11 57.56	9.072	20 36 52.8	27.91	10 36.0
17	20 13 21.43	13.566	20 28 8.2	41.64	22 25.4	19	20 11 22.00	8.698	20 38 41.7	26.51	10 19.7
21	20 14 14.97	13.198	20 25 23.5	40.67	22 10.6	23	20 10 48.05	8.265	20 40 24.7	24.95	10 3.4
25	20 15 6.95	12.787	20 22 43.1	39.53	21 55.7	27	20 10 15.95	7.779	20 42 1.1	23.24	9 47.2
29	20 15 57.21	+12.336	−20 20 7.5	+38.23	21 40.8	31	20 9 45.88	− 7.246	−20 43 30.4	−21.40	9 31.0
Mar. 4	20 16 45.58	11.843	20 17 37.5	36.77	21 25.9	Sept. 4	20 9 18.05	6.663	20 44 52.1	19.43	9 14.8
8	20 17 31.90	11.311	20 15 13.6	35.16	21 10.9	8	20 8 52.64	6.030	20 46 5.6	17.33	8 58.6
12	20 18 16.02	10.746	20 12 56.4	33.42	20 55.9	12	20 8 29.87	5.350	20 47 10.5	15.15	8 42.5
16	20 18 57.82	10.144	20 10 46.4	31.54	20 40.9	16	20 8 9.89	4.633	20 48 6.6	12.87	8 26.5
20	20 19 37.14	+ 9.508	−20 8 44.2	+29.52	20 25.8	20	20 7 52.84	− 3.885	−20 48 53.3	−10.49	8 10.5
24	20 20 13.84	8.834	20 6 50.3	27.38	20 10.7	24	20 7 38.84	3.112	20 49 30.4	8.06	7 54.5
28	20 20 47.77	8.132	20 5 5.3	25.11	19 55.5	28	20 7 27.97	2.317	20 49 57.7	5.57	7 38.6
Apr. 1	20 21 18.87	7.414	20 3 29.6	22.74	19 40.3	Oct. 2	20 7 20.33	1.499	20 50 15.0	3.08	7 22.8
5	20 21 47.05	6.671	20 2 3.5	20.28	19 25.0	6	20 7 16.00	− 0.663	20 50 22.3	− 0.54	7 7.0
9	20 22 12.21	+ 5.905	−20 0 47.4	+17.74	19 9.7	10	20 7 15.04	+ 0.185	−20 50 19.3	+ 2.05	6 51.2
13	20 22 34.26	5.118	19 59 41.7	15.11	18 54.3	14	20 7 17.49	1.042	20 50 5.9	4.65	6 35.6
17	20 22 53.13	4.311	19 58 46.7	12.40	18 38.9	18	20 7 23.38	1.901	20 49 42.1	7.25	6 19.9
21	20 23 8.75	3.494	19 58 2.6	9.66	18 23.4	22	20 7 32.69	2.754	20 49 7.9	9.82	6 4.4
25	20 23 21.08	2.671	19 57 29.5	6.88	18 7.9	26	20 7 45.40	3.598	20 48 23.5	12.36	5 48.8
29	20 23 30.12	+ 1.849	−19 57 7.6	+ 4.08	17 52.3	30	20 8 1.46	+ 4.432	−20 47 29.0	+14.89	5 33.4
May 3	20 23 35.87	1.025	19 56 56.9	+ 1.29	17 36.6	Nov. 3	20 8 20.84	5.255	20 46 24.4	17.39	5 18.0
7	20 23 38.32	+ 0.201	19 56 57.3	− 1.47	17 20.9	7	20 8 43.48	6.063	20 45 9.9	19.85	5 2.6
11	20 23 37.48	− 0.621	19 57 8.7	4.22	17 5.2	11	20 9 9.32	6.850	20 43 45.6	22.27	4 47.3
15	20 23 33.36	1.436	19 57 31.1	6.93	16 49.4	15	20 9 38.27	7.612	20 42 11.7	24.65	4 32.1
19	20 23 26.01	− 2.236	−19 58 4.3	− 9.61	16 33.5	19	20 10 10.21	+ 8.345	−20 40 28.5	+26.94	4 16.9
23	20 23 15.50	3.015	19 58 48.0	12.22	16 17.6	23	20 10 45.01	9.044	20 38 36.3	29.14	4 1.8
27	20 23 1.92	3.770	19 59 41.9	14.71	16 1.7	27	20 11 22.52	9.711	20 36 35.5	31.27	3 46.7
31	20 22 45.38	4.494	20 0 45.5	17.06	15 45.7	Dec. 1	20 12 2.64	10.345	20 34 26.3	33.32	3 31.6
June 4	20 22 26.00	5.195	20 1 58.2	19.29	15 29.6	5	20 12 45.23	10.943	20 32 9.1	35.28	3 16.6
8	20 22 3.86	− 5.866	−20 3 19.6	−21.42	15 13.5	9	20 13 30.13	+11.501	−20 29 44.2	+37.14	3 1.6
12	20 21 39.12	6.498	20 4 49.2	23.38	14 57.4	13	20 14 17.18	12.015	20 27 12.1	38.89	2 46.7
16	20 21 11.93	7.088	20 6 26.4	25.18	14 41.2	17	20 15 6.19	12.483	20 24 33.2	40.51	2 31.8
20	20 20 42.48	7.630	20 8 10.4	26.79	14 24.9	21	20 15 56.98	12.904	20 21 48.1	42.00	2 16.9
24	20 20 10.96	8.120	20 10 0.5	28.22	14 8.7	25	20 16 49.36	13.280	20 18 57.4	43.37	2 2.0
28	20 19 37.59	− 8.557	−20 11 55.9	−29.44	13 52.4	29	20 17 43.16	+13.612	−20 16 1.4	+44.61	1 47.2
July 2	*20 19 2.58*	− 8.942	−20 13 55.8	−30.47	13 36.1	33	20 18 38.20	+13.900	−20 13 0.7	+45.72	1 32.3

Least semidiameter,	January 21,	1″.62	Least horizontal parallax,	January 21,	0″.43
Greatest semidiameter,	July 24,	1″.79	Greatest horizontal parallax,	July 24,	0″.47

GREENWICH MEAN TIME.

Month and Day.	Apparent Right Ascension. Noon.	Var. of R. A. for 1 Day. Noon.	Apparent Declination. Noon.	Var. of Decl. for 1 Day. Noon.	Meridian Passage.	Month and Day.	Apparent Right Ascension. Noon.	Var. of R. A. for 1 Day. Noon.	Apparent Declination. Noon.	Var. of Decl. for 1 Day. Noon.	Meridian Passage.
	h m s	s	° ′ ″	″	h m		h m s	s	° ′ ″	″	h m
Jan. 0	7 37 58.00	−6.895	+20 57 10.9	+16.50	13 0.6	July 2	7 38 55.48	+9.220	+20 59 5.0	−20.93	0 58.1
4	7 37 30.14	7.029	20 58 17.7	16.82	12 44.4	6	7 39 32.57	9.315	20 57 40.4	21.35	0 43.0
8	7 37 1.82	7.117	20 59 25.5	17.05	12 28.2	10	7 40 9.98	9.378	20 56 14.2	21.71	0 27.9
12	7 36 33.23	7.162	21 0 34.1	17.19	12 12.0	14	7 40 47.58	9.409	20 54 46.7	21.99	0 12.8
16	7 36 4.54	7.162	21 1 43.0	17.20	11 55.8	18	7 41 25.23	9.405	20 53 18.3	22.18	23 53.9
20	7 35 35.96	−7.110	+21 2 51.7	+17.10	11 39.6	22	7 42 2.80	+9.367	+20 51 49.3	−22.30	23 38.8
24	7 35 7.69	7.012	21 3 59.8	16.89	11 23.4	26	7 42 40.15	9.298	20 50 19.9	22.35	23 23.7
28	7 34 39.90	6.866	21 5 6.8	16.57	11 7.2	30	7 43 17.17	9.202	20 48 50.4	22.31	23 8.6
Feb. 1	7 34 12.79	6.677	21 6 12.3	16.14	10 51.1	Aug. 3	7 43 53.75	9.075	20 47 21.4	22.18	22 53.5
5	7 33 46.51	6.447	21 7 15.9	15.62	10 34.9	7	7 44 29.75	8.916	20 45 53.1	21.95	22 38.3
9	7 33 21.24	−6.176	+21 8 17.3	+15.02	10 18.8	11	7 45 5.06	+8.726	+20 44 25.8	−21.65	22 23.1
13	7 32 57.14	5.865	21 9 16.1	14.34	10 2.6	15	7 45 39.55	8.505	20 42 59.9	21.26	22 8.0
17	7 32 34.36	5.515	21 10 12.0	13.58	9 46.5	19	7 46 13.08	8.254	20 41 35.7	20.80	21 52.8
21	7 32 13.05	5.125	21 11 4.8	12.76	9 30.4	23	7 46 45.54	7.973	20 40 13.5	20.26	21 37.7
25	7 31 53.38	4.704	21 11 54.1	11.86	9 14.4	27	7 47 16.82	7.662	20 38 53.6	19.64	21 22.4
29	7 31 35.43	−4.258	+21 12 39.7	+10.90	8 58.4	31	7 47 46.81	+7.324	+20 37 36.4	−18.93	21 7.2
Mar. 4	7 31 19.32	3.787	21 13 21.3	9.88	8 42.4	Sept. 4	7 48 15.41	6.963	20 36 22.2	18.11	20 52.0
8	7 31 5.15	3.293	21 13 58.8	8.82	8 26.4	8	7 48 42.52	6.578	20 35 11.5	17.21	20 36.7
12	7 30 53.00	2.778	21 14 31.9	7.73	8 10.5	12	7 49 8.02	6.165	20 34 4.5	16.24	20 21.4
16	7 30 42.94	2.245	21 15 0.6	6.60	7 54.7	16	7 49 31.82	5.726	20 33 1.6	15.19	20 6.0
20	7 30 35.05	−1.698	+21 15 24.7	+ 5.42	7 38.8	20	7 49 53.81	+5.264	+20 32 3.0	−14.08	19 50.6
24	7 30 29.38	1.137	21 15 44.0	4.22	7 23.0	24	7 50 13.92	4.785	20 31 9.0	12.90	19 35.2
28	7 30 25.99	−0.567	21 15 58.5	3.01	7 7.2	28	7 50 32.07	4.288	20 30 19.8	11.66	19 19.8
Apr. 1	7 30 24.86	+0.002	21 16 8.1	1.79	6 51.4	Oct. 2	7 50 48.21	3.775	20 29 35.7	10.35	19 4.3
5	7 30 26.01	0.572	21 16 12.8	+ 0.55	6 35.7	6	7 51 2.26	3.246	20 28 57.0	8.99	18 48.8
9	7 30 29.43	+1.139	+21 16 12.5	− 0.70	6 20.0	10	7 51 14.17	+2.701	+20 28 23.8	− 7.58	18 33.3
13	7 30 35.12	1.704	21 16 7.2	1.95	6 4.4	14	7 51 23.86	2.143	20 27 56.4	6.12	18 17.7
17	7 30 43.06	2.267	21 15 56.9	3.19	5 48.8	18	7 51 31.31	1.579	20 27 34.9	4.64	18 2.2
21	7 30 53.25	2.822	21 15 41.7	4.40	5 33.2	22	7 51 36.49	1.012	20 27 19.3	3.13	17 46.5
25	7 31 5.62	3.362	21 15 21.7	5.61	5 17.7	26	7 51 39.39	+0.441	20 27 9.8	1.60	17 30.8
29	7 31 20.13	+3.885	+21 14 56.8	− 6.81	5 2.2	30	7 51 40.02	−0.132	+20 27 6.5	− 0.08	17 15.1
May 3	7 31 36.70	4.392	21 14 27.2	7.99	4 46.8	Nov. 3	7 51 38.35	0.703	20 27 9.2	+ 1.44	16 59.3
7	7 31 55.27	4.887	21 13 52.9	9.14	4 31.4	7	7 51 34.40	1.268	20 27 18.0	2.96	16 43.5
11	7 32 15.78	5.365	21 13 14.1	10.25	4 16.0	11	7 51 28.21	1.823	20 27 32.9	4.49	16 27.7
15	7 32 38.15	5.819	21 12 30.9	11.35	4 0.6	15	7 51 19.83	2.365	20 27 53.9	5.98	16 11.8
19	7 33 2.30	+6.251	+21 11 43.3	−12.43	3 45.3	19	7 51 9.30	−2.894	+20 28 20.7	+ 7.39	15 55.9
23	7 33 28.14	6.657	21 10 51.5	13.45	3 30.0	23	7 50 56.68	3.407	20 28 53.0	8.76	15 39.9
27	7 33 55.54	7.037	21 9 55.7	14.43	3 14.8	27	7 50 42.06	3.897	20 29 30.8	10.09	15 24.0
31	7 34 24.42	7.394	21 8 56.1	15.35	2 59.5	Dec. 1	7 50 25.53	4.361	20 30 13.7	11.34	15 8.0
June 4	7 34 54.68	7.726	21 7 52.9	16.24	2 44.3	5	7 50 7.18	4.801	20 31 1.5	12.52	14 52.0
8	7 35 26.20	+8.028	+21 6 46.2	−17.08	2 29.1	9	7 49 47.13	−5.213	+20 31 53.8	+13.64	14 35.9
12	7 35 58.87	8.303	21 5 36.3	17.88	2 13.9	13	7 49 25.50	5.590	20 32 50.5	14.65	14 19.8
16	7 36 32.60	8.552	21 4 23.2	18.64	1 58.7	17	7 49 2.44	5.926	20 33 51.0	15.54	14 3.7
20	7 37 7.26	8.766	21 3 7.2	19.33	1 43.6	21	7 48 38.11	6.223	20 34 54.8	16.31	13 47.5
24	7 37 42.71	8.949	21 1 48.6	19.93	1 28.4	25	7 48 12.67	6.483	20 36 1.5	17.00	13 31.4
28	7 38 18.83	+9.099	+21 0 27.8	−20.45	1 13.3	29	7 47 46.27	−6.702	+20 37 10.8	+17.58	13 15.2

Greatest semidiameter, *January 12, 1″.33*
Least semidiameter, *July 16, 1″.24*

Greatest horizontal parallax, January 12, 0″.31
Least horizontal parallax, July 16, 0″.29

HELIOCENTRIC CO-ORDINATES, 1912.

MERCURY.

GREENWICH MEAN NOON.

Date.		Heliocentric Longitude, Mean Equinox of Date.	Daily Motion.	Reduction to Orbit.	Heliocentric Latitude.	Daily Motion.	Logarithm of Radius Vector.	Logarithm of Distance from Earth—	
								At Date.	At Intermediate Date.
		° ′ ″	° ′ ″	′ ″	° ′ ″	′ ″			
Jan.	1	133 11 49.2	5 26 6.2	+ 1 49.5	+6 59 7.6	+ 2 49.0	9.523 1266	9.864 1200	9.868 8748
	2	138 33 8.9	5 16 31.6	− 0 33.9	7 0 5.1	− 0 50.7	9.529 6141	9.873 7794	9.878 8080
	3	143 44 50.3	5 6 51.0	2 52.0	6 57 32.7	4 10.6	9.536 3166	9.883 9361	9.889 1411
	4	148 46 51.5	4 57 12.5	5 0.5	6 51 50.6	7 10.2	9.543 1613	9.894 4023	9.899 7009
	5	153 39 18.2	4 47 42.9	6 56.3	6 43 19.1	9 49.4	9.550 0826	9.905 0200	9.910 3443
	6	158 22 22.0	4 38 27.6	− 8 37.0	+6 32 18.4	−12 8.7	9.557 0220	9.915 6600	9.920 9551
	7	162 56 19.4	4 29 30.6	10 1.3	6 19 7.8	14 9.4	9.563 9284	9.926 2190	9.931 4426
	8	167 21 30.2	4 20 55.0	11 8.5	6 4 5.3	15 52.7	9.570 7576	9.936 6176	9.941 7370
	9	171 38 17.2	4 12 43.2	11 58.6	5 47 27.6	17 20.2	9.577 4717	9.946 7949	9.951 7862
	10	175 47 4.8	4 4 56.3	12 31.8	5 29 29.6	18 33.4	9.584 0390	9.956 7067	9.961 5529
	11	179 48 18.3	3 57 35.0	−12 49.1	+5 10 25.0	−19 33.7	9.590 4328	9.966 3220	9.971 0118
	12	183 42 23.5	3 50 39.7	12 51.5	4 50 25.9	20 22.7	9.596 6311	9.975 6204	9.980 1468
	13	187 29 46.4	3 44 10.3	12 40.1	4 29 42.9	21 1.7	9.602 6159	9.984 5899	9.988 9493
	14	191 10 52.6	3 38 6.2	12 16.2	4 8 25.4	21 31.9	9.608 3728	9.993 2247	9.997 4161
	15	194 46 7.0	3 32 26.7	11 41.3	3 46 41.5	21 54.5	9.613 8903	0.001 5238	0.005 5482
	16	198 15 54.0	3 27 11.1	−10 56.6	+3 24 38.4	−22 10.5	9.619 1594	0.009 4901	0.013 3504
	17	201 40 36.9	3 22 18.5	10 3.5	3 2 22.3	22 20.8	9.624 1735	0.017 1299	0.020 8293
	18	205 0 38.3	3 17 47.9	9 3.3	2 39 58.5	22 26.1	9.628 9274	0.024 4498	0.027 9925
	19	208 16 19.8	3 13 38.5	7 57.2	2 17 31.6	22 27.1	9.633 4174	0.031 4585	0.034 8492
	20	211 28 2.0	3 9 49.2	6 46.5	1 55 5.5	22 24.5	9.637 6411	0.038 1658	0.041 4096
	21	214 36 4.6	3 6 19.2	− 5 32.1	+1 32 43.6	−22 18.7	9.641 5969	0.044 5817	0.047 6836
	22	217 40 46.6	3 3 7.6	4 15.1	1 10 28.9	22 10.2	9.645 2841	0.050 7166	0.053 6819
	23	220 42 25.8	3 0 13.6	2 56.5	0 48 24.0	21 59.3	9.648 7024	0.056 5809	0.059 4147
	24	223 41 19.4	2 57 36.4	1 37.2	0 26 31.0	21 46.3	9.651 8521	0.062 1846	0.064 8918
	25	226 37 44.0	2 55 15.3	− 0 17.9	+0 4 51.9	21 31.6	9.654 7338	0.067 5377	0.070 1233
	26	229 31 55.2	2 53 9.6	+ 1 0.6	−0 16 31.6	−21 15.2	9.657 3483	0.072 6497	0.075 1182
	27	232 24 8.3	2 51 18.9	2 17.6	0 37 38.1	20 57.4	9.659 6965	0.077 5298	0.079 8857
	28	235 14 37.9	2 49 42.5	3 32.5	0 58 26.2	20 38.4	9.661 7794	0.082 1868	0.084 4342
	29	238 3 38.0	2 48 20.0	4 44.6	1 18 54.6	20 18.1	9.663 5981	0.086 6289	0.088 7718
	30	240 51 22.4	2 47 11.0	5 53.4	1 39 2.1	19 56.8	9.665 1534	0.090 8639	0.092 9061
	31	243 38 4.4	2 46 15.1	+ 6 58.4	−1 58 47.8	−19 34.4	9.666 4463	0.094 8992	0.096 8440
Feb.	1	246 23 56.9	2 45 32.0	7 59.2	2 18 10.6	19 10.9	9.667 4775	0.098 7413	0.100 5919
	2	249 9 12.6	2 45 1.5	8 55.3	2 37 9.3	18 46.4	9.668 2477	0.102 3965	0.104 1557
	3	251 54 4.0	2 44 43.5	9 46.3	2 55 43.1	18 20.9	9.668 7574	0.105 8703	0.107 5408
	4	254 38 43.5	2 44 37.7	10 31.8	3 13 50.8	17 54.2	9.669 0068	0.109 1679	0.110 7522
	5	257 23 23.5	2 44 44.2	+11 11.4	−3 31 31.2	−17 26.4	9.668 9963	0.112 2942	0.113 7943
	6	260 8 16.1	2 45 2.9	11 44.9	3 48 43.2	16 57.4	9.668 7258	0.115 2531	0.116 6710
	7	262 53 33.4	2 45 33.8	12 12.0	4 5 25.6	16 27.1	9.668 1951	0.118 0483	0.119 3853
	8	265 39 27.7	2 46 17.0	12 32.3	4 21 37.0	15 55.4	9.667 4038	0.120 6826	0.121 9404
	9	268 26 11.5	2 47 12.6	12 45.7	4 37 15.8	15 22.0	9.666 3515	0.123 1590	0.124 3388
	10	271 13 57.2	2 48 20.9	+12 51.9	−4 52 20.4	−14 46.9	9.665 0375	0.125 4797	0.126 5822
	11	274 2 57.5	2 49 42.0	12 50.7	5 6 49.0	14 10.0	9.663 4609	0.127 6463	0.128 6722
	12	276 53 25.5	2 51 16.2	12 41.9	5 20 39.7	13 31.0	9.661 6209	0.129 6599	0.130 6096
	13	279 45 34.4	2 53 3.8	12 25.5	5 33 50.3	12 49.7	9.659 5165	0.131 5212	0.132 3948
	14	282 39 37.8	2 55 5.3	12 1.3	5 46 18.3	12 5.9	9.657 1467	0.133 2302	0.134 0275
	15	285 35 49.8	2 57 21.1	+11 29.3	−5 58 1.1	−11 19.3	9.654 5106	0.134 7865	0.135 5071
	16	*288 34 24.9*	*2 59 51.7*	+10 49.5	−6 8 55.9	−10 29.6	9.651 6072	0.136 1891	0.136 8323

MERCURY.

GREENWICH MEAN NOON.

Date.	Heliocentric Longitude, Mean Equinox of Date.	Daily Motion.	Reduction to Orbit.	Heliocentric Latitude.	Daily Motion.	Logarithm of Radius Vector.	Logarithm of Distance from Earth— At Date.	Logarithm of Distance from Earth— At Intermediate Date.
	° ′ ″	° ′ ″	′ ″	° ′ ″	′ ″			
eb. 15	285 35 49.8	2 57 21.1	+11 29.3	−5 58 1.1	−11 19.3	9.654 5106	0.134 7865	0.135 5071
16	288 34 24.9	2 59 51.7	10 49.5	6 8 55.9	10 29.6	9.651 6072	0.136 1891	0.136 8323
17	291 35 38.2	3 2 37.4	10 2.1	6 18 59.3	9 36.5	9.648 4357	0.137 4363	0.138 0010
18	294 39 45.0	3 5 39.0	9 7.1	6 28 7.7	8 39.7	9.644 9955	0.138 5259	0.139 0106
19	297 47 1.6	3 8 57.0	8 4.7	6 36 17.3	7 38.8	9.641 2864	0.139 4547	0.139 8578
20	300 57 44.8	3 12 32.2	+ 6 55.4	−6 43 23.9	− 6 33.5	9.637 3087	0.140 2192	0.140 5384
21	304 12 12.0	3 16 25.2	5 39.5	6 49 22.7	5 23.2	9.633 0633	0.140 8149	0.141 0479
22	307 30 41.3	3 20 36.6	4 17.6	6 54 8.5	4 7.5	9.628 5518	0.141 2367	0.141 3805
23	310 53 31.5	3 25 7.2	2 50.4	6 57 35.7	2 46.0	9.623 7766	0.141 4783	0.141 5293
24	314 21 2.3	3 29 57.8	+ 1 18.8	6 59 38.3	− 1 18.2	9.618 7415	0.141 5325	0.141 4868
25	317 53 33.9	3 35 8.9	− 0 16.2	−7 0 9.8	+ 0 16.4	9.613 4516	0.141 3912	0.141 2444
26	321 31 27.1	3 40 41.2	1 53.3	6 59 3.1	1 58.3	9.607 9140	0.141 0453	0.140 7925
27	325 15 3.6	3 46 35.4	3 31.1	6 56 10.6	3 47.9	9.602 1378	0.140 4845	0.140 1199
28	329 4 45.3	3 52 51.8	5 7.9	6 51 24.5	5 45.7	9.596 1349	0.139 6971	0.139 2146
29	333 0 54.7	3 59 30.7	6 41.7	6 44 36.5	7 51.9	9.589 9199	0.138 6706	0.138 0632
Mar. 1	337 3 54.2	4 6 32.1	− 8 10.3	−6 35 38.0	+10 6.7	9.583 5109	0.137 3905	0.136 6505
2	341 14 6.4	4 13 55.9	9 31.4	6 24 20.3	12 30.1	9.576 9303	0.135 8411	0.134 9603
3	345 31 53.2	4 21 41.2	10 42.5	6 10 34.9	15 2.1	9.570 2051	0.134 0056	0.132 9747
4	349 57 35.7	4 29 47.2	11 40.8	5 54 13.5	17 42.0	9.563 3677	0.131 8651	0.130 6744
5	354 31 33.8	4 38 12.0	12 23.4	5 35 8.5	20 29.0	9.556 4565	0.129 3999	0.128 0389
6	359 14 5.2	4 46 53.3	−12 47.6	−5 13 13.7	+23 21.6	9.549 5162	0.126 5886	0.125 0462
7	4 5 24.9	4 55 48.0	12 51.0	4 48 24.1	26 18.1	9.542 5985	0.123 4087	0.121 6732
8	9 5 44.3	5 4 52.0	12 31.3	4 20 37.1	29 15.8	9.535 7624	0.119 8366	0.117 8959
9	14 15 10.2	5 14 0.1	11 47.0	3 49 53.1	32 11.5	9.529 0742	0.115 8480	0.113 6899
10	19 33 43.7	5 23 6.0	10 37.5	3 16 16.2	35 1.1	9.522 6071	0.111 4185	0.109 0308
11	25 1 19.1	5 32 2.6	− 9 3.1	−2 39 54.6	+37 39.9	9.516 4405	0.106 5239	0.103 8948
12	30 37 42.9	5 40 41.3	7 5.6	2 1 1.8	40 2.5	9.510 6587	0.101 1407	0.098 2590
13	36 22 32.5	5 48 52.6	4 48.2	1 19 56.8	42 3.4	9.505 3493	0.095 2472	0.092 1030
14	42 15 15.6	5 56 26.4	− 2 15.6	−0 37 4.2	43 36.6	9.500 6000	0.088 8241	0.085 4087
15	48 15 9.3	6 3 12.0	+ 0 26.0	+0 7 5.4	44 36.5	9.496 4956	0.081 8553	0.078 1626
16	54 21 20.0	6 8 58.8	+ 3 9.2	+0 51 56.1	+44 58.3	9.493 1151	0.074 3294	0.070 3551
17	60 32 44.1	6 13 36.9	5 45.9	1 36 48.0	44 38.2	9.490 5272	0.066 2396	0.061 9828
18	66 48 8.0	6 16 57.3	8 7.7	2 20 57.9	43 34.3	9.488 7869	0.057 5853	0.053 0480
19	73 6 10.6	6 18 53.1	10 6.8	3 3 42.0	41 46.7	9.487 9326	0.048 3725	0.043 5605
20	79 25 24.8	6 19 19.7	11 36.8	3 44 17.4	39 17.5	9.487 9835	0.038 6142	0.033 5364
21	85 44 20.0	6 18 15.2	+12 32.8	+4 22 4.5	+36 10.7	9.488 9384	0.028 3305	0.023 0000
22	92 1 25.4	6 15 40.7	12 52.3	4 56 28.4	32 32.4	9.490 7759	0.017 5490	0.011 9819
23	98 15 12.9	6 11 40.2	12 35.0	5 27 1.2	28 29.7	9.493 4556	0.006 3036	0.000 5192
24	104 24 19.6	6 6 20.7	11 43.2	5 53 22.4	24 10.6	9.496 9208	9.994 6345	9.988 6555
25	110 27 30.9	5 59 50.9	10 20.7	6 15 19.5	19 43.0	9.501 1014	9.982 5885	9.976 4401
26	116 23 41.5	5 52 21.3	+ 8 33.2	+6 32 47.9	+15 14.2	9.505 9178	9.970 2173	9.963 9272
27	122 11 57.5	5 44 3.5	6 27.0	6 45 49.8	10 51.1	9.511 2844	9.957 5774	9.951 1755
28	127 51 36.3	5 35 9.0	4 8.8	6 54 33.7	6 39.0	9.517 1134	9.944 7294	9.938 2473
29	133 22 6.9	5 25 49.0	+ 1 45.1	6 59 12.7	+ 2 41.9	9.523 3177	9.931 7376	9.925 2090
30	138 43 9.3	5 16 14.1	− 0 38.3	7 0 3.4	− 0 57.2	9.529 8135	9.918 6701	9.912 1301
31	143 54 33.1	5 6 33.4	− 2 56.2	+6 57 24.8	− 4 16.5	9.536 5219	9.905 5983	9.899 0839
Apr. 1	148 56 16.8	4 56 55.0	− 5 4.4	+6 51 37.1	− 7 15.4	9.543 3703	9.892 5963	9.886 1454

MERCURY.

GREENWICH MEAN NOON.

Date.	Heliocentric Longitude, Mean Equinox of Date.	Daily Motion.	Reduction to Orbit.	Heliocentric Latitude.	Daily Motion.	Logarithm of Radius Vector.	Logarithm of Distance from Earth— At Date.	Logarithm of Distance from Earth— At Intermediate Date.
	° ′ ″	° ′ ″	′ ″	° ′ ″	′ ″			
Apr. 1	148 56 16.8	4 56 55.0	− 5 4.4	+6 51 37.1	− 7 15.4	9.543 3703	9.892 5963	9.886 1454
2	153 48 26.1	4 47 25.7	6 59.7	6 43 0.7	9 54.0	9.550 2934	9.879 7413	9.873 3940
3	158 31 13.0	4 38 10.8	8 39.9	6 31 55.7	12 12.8	9.557 2329	9.867 1136	9.860 9104
4	163 4 53.9	4 29 14.4	10 3.7	6 18 41.3	14 12.9	9.564 1378	9.854 7949	9.848 7776
5	167 29 48.9	4 20 39.6	11 10.4	6 3 35.6	15 55.7	9.570 9643	9.842 8690	9.837 0799
6	171 46 20.9	4 12 28.5	−11 59.9	+5 46 55.1	−17 22.8	9.577 6748	9.831 4208	9.825 9023
7	175 54 54.1	4 4 42.3	12 32.6	5 28 54.8	18 35.5	9.584 2376	9.820 5348	9.815 3288
8	179 55 54.0	3 57 21.9	12 49.4	5 9 48.3	19 35.5	9.590 6260	9.810 2944	9.805 4416
9	183 49 46.5	3 50 27.4	12 51.3	4 49 47.6	20 24.1	9.596 8182	9.800 7800	9.796 3188
10	187 36 57.4	3 43 58.7	12 39.5	4 29 3.4	21 2.8	9.602 7964	9.792 0670	9.788 0328
11	191 17 52.3	3 37 55.3	−12 15.3	+4 7 44.9	−21 32.8	9.608 5463	9.784 2241	9.780 6481
12	194 52 56.2	3 32 16.6	11 40.0	3 46 0.4	21 55.1	9.614 0565	9.777 3113	9.774 2195
13	198 22 33.4	3 27 1.7	10 55.0	3 23 56.8	22 10.9	9.619 3181	9.771 3780	9.768 7909
14	201 47 7.3	3 22 9.8	10 1.7	3 1 40.4	22 21.0	9.624 3244	9.766 4614	9.764 3922
15	205 7 0.3	3 17 39.9	9 1.3	2 39 16.4	22 26.2	9.629 0703	9.762 5848	9.761 0400
16	208 22 34.0	3 13 31.1	− 7 55.1	+2 16 49.4	−22 27.1	9.633 5522	9.759 7576	9.758 7366
17	211 34 9.1	3 9 42.4	6 44.2	1 54 23.4	22 24.4	9.637 7677	9.757 9750	9.757 4701
18	214 42 5.2	3 6 12.9	5 29.8	1 32 1.7	22 18.5	9.641 7153	9.757 2183	9.757 2154
19	217 46 41.1	3 3 1.9	4 12.7	1 9 47.3	22 9.9	9.645 3943	9.757 4564	9.757 9356
20	220 48 14.9	3 0 8.4	2 54.0	0 47 42.7	21 59.0	9.648 8045	9.758 6468	9.759 5832
21	223 47 3.6	2 57 31.7	− 1 34.7	+0 25 50.1	−21 46.0	9.651 9460	9.760 7377	9.762 1026
22	226 43 23.7	2 55 11.1	− 0 15.4	+0 4 11.4	21 31.1	9.654 8196	9.763 6699	9.765 4316
23	229 37 31.0	2 53 6.0	+ 1 3.1	−0 17 11.6	21 14.7	9.657 4260	9.767 3795	9.769 5052
24	232 29 40.6	2 51 15.7	2 20.0	0 38 17.5	20 56.9	9.659 7660	9.771 8001	9.774 2555
25	235 20 7.2	2 49 39.7	3 34.7	0 59 5.0	20 37.8	9.661 8407	9.776 8629	9.779 6139
26	238 9 4.7	2 48 17.6	+ 4 46.8	−1 19 32.7	−20 17.5	9.663 6512	9.782 5002	9.785 5137
27	240 56 46.9	2 47 9.0	5 55.5	1 39 39.6	19 56.1	9.665 1985	9.788 6464	9.791 8907
28	243 43 27.0	2 46 13.5	7 0.4	1 59 24.6	19 33.7	9.666 4833	9.795 2389	9.798 6838
29	246 29 18.1	2 45 30.8	8 1.0	2 18 46.6	19 10.2	9.667 5065	9.802 2183	9.805 8358
30	249 14 32.8	2 45 0.7	8 57.0	2 37 44.6	18 45.7	9.668 2686	9.809 5296	9.813 2937
May 1	251 59 23.6	2 44 43.0	+ 9 47.8	−2 56 17.5	−18 20.1	9.668 7702	9.817 1221	9.821 0093
2	254 44 2.9	2 44 37.7	10 33.1	3 14 24.3	17 53.4	9.669 0117	9.824 9499	9.828 9389
3	257 28 43.0	2 44 44.6	11 12.6	3 32 3.9	17 25.5	9.668 9931	9.832 9715	9.837 0432
4	260 13 36.1	2 45 3.6	11 45.9	3 49 15.1	16 56.5	9.668 7146	9.841 1498	9.845 2872
5	262 58 54.3	2 45 34.9	12 12.7	4 5 56.5	16 26.1	9.668 1760	9.849 4517	9.853 6396
6	265 44 49.9	2 46 18.5	+12 32.9	−4 22 6.8	−15 54.3	9.667 3767	9.857 8477	9.862 0729
7	268 31 35.3	2 47 14.5	12 46.0	4 37 44.6	15 20.9	9.666 3163	9.866 3123	9.870 5633
8	271 19 23.0	2 48 23.1	12 52.0	4 52 48.1	14 45.8	9.664 9941	9.874 8233	9.879 0900
9	274 8 25.8	2 49 44.6	12 50.5	5 7 15.6	14 8.8	9.663 4093	9.883 3610	9.887 6344
10	276 58 56.6	2 51 19.2	12 41.5	5 21 5.0	13 29.7	9.661 5611	9.891 9082	9.896 1806
11	279 51 8.7	2 53 7.3	+12 24.8	−5 34 14.3	−12 48.3	9.659 4485	9.900 4500	9.904 7147
12	282 45 15.8	2 55 9.2	12 0.4	5 46 40.9	12 4.4	9.657 0705	9.908 9733	9.913 2244
13	285 41 31.9	2 57 25.4	11 28.2	5 58 22.3	11 17.8	9.654 4261	9.917 4666	9.921 6988
14	288 40 11.6	2 59 56.4	10 48.2	6 9 15.5	10 28.0	9.651 5143	9.925 9198	9.930 1286
15	291 41 29.9	3 2 42.7	10 0.5	6 19 17.2	9 34.8	9.648 3344	9.934 3242	9.938 5055
16	*294 45 42.3*	3 5 44.8	+ 9 5.2	−6 28 23.9	− 8 37.9	9.644 8859	9.942 0716	9.946 8217
17	*297 53 5.0*	*3 9 3.3*	+ 8 2.7	−6 36 31.7	− 7 36.9	9.641 1685	9.950 9550	9.955 0706

MERCURY.

GREENWICH MEAN NOON.

Date.	Heliocentric Longitude, Mean Equinox of Date.	Daily Motion.	Reduction to Orbit.	Heliocentric Latitude.	Daily Motion.	Logarithm of Radius Vector.	Logarithm of Distance from Earth— At Date.	Logarithm of Distance from Earth— At Intermediate Date.
	° ′ ″	° ′ ″	′ ″	° ′ ″	′ ″			
May 17	297 53 5.0	3 9 3.3	+ 8 2.7	−6 36 31.7	− 7 36.9	9.641 1685	9.950 9550	9.955 0706
18	301 3 54.7	3 12 39.0	6 53.1	6 43 36.2	6 31.3	9.637 1826	9.959 1676	9.963 2452
19	304 18 29.0	3 16 32.6	5 37.0	6 49 32.7	5 20.8	9.632 9288	9.967 3028	9.971 3395
20	307 37 6.0	3 20 44.6	4 15.0	6 54 16.1	4 5.0	9.628 4090	9.975 3546	9.979 3473
21	311 0 4.6	3 25 15.8	2 47.6	6 57 40.8	2 43.3	9.623 6256	9.983 3168	9.987 2622
22	314 27 44.3	3 30 7.0	+ 1 15.9	−6 59 40.7	− 1 15.3	9.618 5824	9.991 1827	9.995 0775
23	318 0 25.4	3 35 18.7	− 0 19.2	7 0 9.2	+ 0 19.5	9.613 2847	9.998 9458	0.002 7866
24	321 38 28.8	3 40 51.8	1 56.3	6 58 59.3	2 1.5	9.607 7394	0.006 5990	0.010 3820
25	325 22 16.2	3 46 46.7	3 34.1	6 56 3.5	3 51.5	9.601 9559	0.014 1345	0.017 8555
26	329 12 9.6	3 53 3.8	5 10.8	6 51 13.7	5 49.5	9.595 9461	0.021 5438	0.025 1983
27	333 8 31.3	3 59 43.4	− 6 44.5	−6 44 21.7	+ 7 55.9	9.589 7247	0.028 8175	0.032 4002
28	337 11 43.8	4 6 45.5	8 13.0	6 35 19.0	10 11.0	9.583 3098	0.035 9450	0.039 4504
29	341 22 9.6	4 14 9.9	9 33.9	6 23 56.9	12 34.7	9.576 7240	0.042 9149	0.046 3369
30	345 40 10.8	4 21 56.0	10 44.6	6 10 6.8	15 6.9	9.569 9946	0.049 7147	0.053 0464
31	350 6 8.4	4 30 2.5	11 42.3	5 53 40.4	17 47.1	9.563 1542	0.056 3301	0.059 5638
June 1	354 40 22.1	4 38 27.9	−12 24.4	−5 34 30.3	+20 34.2	9.556 2412	0.062 7454	0.065 8727
2	359 23 9.7	4 47 9.8	12 48.0	5 12 30.1	23 27.0	9.549 3005	0.068 9436	0.071 9558
3	4 14 46.1	4 56 4.9	12 50.7	4 47 35.0	26 23.6	9.542 3840	0.074 9069	0.077 7944
4	9 15 22.4	5 5 9.0	12 30.3	4 19 42.5	29 21.3	9.535 5511	0.080 6155	0.083 3676
5	14 25 5.3	5 14 17.2	11 45.2	3 48 53.1	32 16.8	9.528 8683	0.086 0479	0.088 6535
6	19 43 55.9	5 23 23.0	−10 34.9	−3 15 10.9	+35 6.2	9.522 4089	0.091 1818	0.093 6298
7	25 11 48.1	5 32 19.2	8 59.8	2 38 44.4	37 44.6	9.516 2526	0.095 9947	0.098 2734
8	30 48 28.2	5 40 57.2	7 1.6	1 59 47.2	40 6.7	9.510 4840	0.100 4630	0.102 5605
9	36 33 33.3	5 49 7.6	4 43.6	1 18 38.3	42 6.8	9.505 1904	0.104 5631	0.106 4678
10	42 26 30.7	5 56 40.0	− 2 10.6	−0 35 42.8	43 39.0	9.500 4595	0.108 2721	0.109 9731
11	48 26 37.2	6 3 23.9	+ 0 31.1	+0 8 28.6	+44 37.7	9.496 3763	0.111 5684	0.113 0556
12	54 32 59.0	6 9 8.8	3 14.2	0 53 20.0	44 58.2	9.493 0192	0.114 4326	0.115 6973
13	60 44 31.9	6 13 44.8	5 50.5	1 38 11.2	44 36.8	9.490 4565	0.116 8479	0.117 8829
14	67 0 2.4	6 17 2.6	8 11.8	2 22 19.2	43 31.6	9.488 7432	0.118 8008	0.119 6006
15	73 18 8.9	6 18 55.7	10 10.1	3 5 0.0	41 42.7	9.487 9169	0.120 2816	0.120 8434
16	79 37 24.1	6 19 19.5	+11 39.1	+3 45 30.8	+39 12.2	9.487 9960	0.121 2858	0.121 6087
17	85 56 17.6	6 18 12.2	12 34.0	4 23 12.0	36 4.4	9.488 9787	0.121 8126	0.121 8982
18	92 13 18.5	6 15 34.9	12 52.3	4 57 29.2	32 25.2	9.490 8431	0.121 8664	0.121 7185
19	98 26 58.8	6 11 31.9	12 33.9	5 27 54.4	28 21.8	9.493 5483	0.121 4561	0.121 0808
20	104 35 56.0	6 6 10.0	11 41.0	5 54 7.5	24 2.4	9.497 0369	0.120 5946	0.119 9995
21	110 38 55.4	5 59 38.0	+10 17.7	+6 15 56.4	+19 34.6	9.501 2386	0.119 2979	0.118 4922
22	116 34 52.2	5 52 6.8	8 29.5	6 33 16.4	15 5.9	9.506 0737	0.117 5851	0.116 5792
23	122 22 52.9	5 43 47.6	6 22.8	6 46 10.1	10 43.0	9.511 4564	0.115 4774	0.114 2824
24	128 2 15.3	5 34 52.0	4 4.4	6 54 46.1	6 31.3	9.517 2987	0.112 9972	0.111 6246
25	133 32 28.7	5 25 31.5	+ 1 40.5	6 59 17.7	+ 2 34.7	9.523 5136	0.110 1675	0.108 6288
26	138 53 13.3	5 15 56.2	− 0 42.8	+7 0 1.5	− 1 3.8	9.530 0174	0.107 0114	0.105 3180
27	144 4 19.2	5 6 15.5	3 0.4	6 57 16.7	4 22.4	9.536 7314	0.103 5514	0.101 7144
28	149 5 45.0	4 56 37.2	5 8.2	6 51 23.4	7 20.7	9.543 5834	0.099 8097	0.097 8398
29	153 57 36.7	4 47 8.3	7 3.0	6 42 42.0	9 58.7	9.550 5081	0.095 8071	0.093 7141
30	158 40 6.4	4 37 53.9	8 42.8	6 31 32.6	12 16.8	9.557 4475	0.091 5631	0.089 3563
ly 1	163 13 30.7	4 28 58.1	−10 6.0	+6 18 14.5	−14 16.3	9.564 3509	0.087 0958	0.084 7837
2	167 38 9.8	4 20 23.9	−11 12.2	+6 3 5.6	−15 58.7	9.571 1746	0.082 4218	0.080 0120

MERCURY.

GREENWICH MEAN NOON.

Date.		Heliocentric Longitude, Mean Equinox of Date.	Daily Motion.	Reduction to Orbit.	Heliocentric Latitude.	Daily Motion.	Logarithm of Radius Vector.	Logarithm of Distanc Earth—	
								At Date.	At Im diate
		° ′ ″	° ′ ″	′ ″	° ′ ″	′ ″			
July	1	163 13 30.7	4 28 58.1	−10 6.0	+6 18 14.5	−14 16.3	9.564 3509	0.087 0958	0.084
	2	167 38 9.8	4 20 23.9	11 12.2	6 3 5.6	15 58.7	9.571 1745	0.082 4218	0.080
	3	171 54 26.4	4 12 13.5	12 1.1	5 46 22.3	17 25.3	9.577 8811	0.077 5561	0.075
	4	176 2 45.1	4 4 28.2	12 33.4	5 28 19.7	18 37.6	9.584 4389	0.072 5123	0.069
	5	180 3 31.3	3 57 8.5	12 49.7	5 9 11.3	19 37.1	9.590 8216	0.067 3026	0.064
	6	183 57 10.8	3 50 14.9	−12 51.2	+4 49 9.2	−20 25.4	9.597 0075	0.061 9378	0.059
	7	187 44 9.6	3 43 47.0	12 38.9	4 28 23.8	21 3.8	9.602 9789	0.056 4276	0.053
	8	191 24 53.2	3 37 44.3	12 14.3	4 7 4.4	21 33.6	9.608 7216	0.050 7803	0.047
	9	194 59 46.5	3 32 6.3	11 38.7	3 45 19.1	21 55.8	9.614 2243	0.045 0029	0.042
	10	198 29 13.9	3 26 52.2	10 53.5	3 23 15.0	22 11.4	9.619 4782	0.039 1021	0.036
	11	201 53 38.6	3 22 1.0	− 9 59.9	+3 0 58.2	−22 21.3	9.624 4766	0.033 0832	0.030
	12	205 13 23.2	3 17 31.8	8 59.3	2 38 34.1	22 26.3	9.629 2144	0.026 9507	0.023
	13	208 28 49.1	3 13 23.6	7 52.9	2 16 7.1	22 27.1	9.633 6881	0.020 7083	0.017
	14	211 40 17.0	3 9 35.5	6 41.9	1 53 41.1	22 24.3	9.637 8953	0.014 3598	0.011
	15	214 48 6.5	3 6 6.7	5 27.3	1 31 19.6	22 18.3	9.641 8346	0.007 9078	0.004
	16	217 52 36.5	3 2 56.2	− 4 10.2	+1 9 5.4	−22 9.6	9.645 5052	0.001 3547	9.998
	17	220 54 4.8	3 0 3.2	2 51.5	0 47 1.2	21 58.6	9.648 9070	9.994 7030	9.991
	18	223 52 48.6	2 57 27.1	1 32.2	0 25 9.0	21 45.5	9.652 0401	9.987 9546	9.984
	19	226 49 4.3	2 55 7.0	− 0 12.9	+0 3 30.8	21 30.6	9.654 9053	9.981 1113	9.977
	20	229 43 7.7	2 53 2.3	+ 1 5.5	−0 17 51.7	21 14.2	9.657 5033	9.974 1753	9.970
	21	232 35 13.9	2 51 12.5	+ 2 22.4	−0 38 57.1	−20 56.4	9.659 8351	9.967 1489	9.963
	22	235 25 37.4	2 49 36.9	3 37.1	0 59 43.9	20 37.2	9.661 9016	9.960 0344	9.95
	23	238 14 32.3	2 48 15.2	4 49.0	1 20 11.0	20 16.8	9.663 7039	9.952 8344	9.94
	24	241 2 12.3	2 47 7.0	5 57.6	1 40 17.2	19 55.4	9.665 2430	9.945 5526	9.941
	25	243 48 50.7	2 46 11.9	7 2.3	2 0 1.4	19 32.9	9.666 5196	9.938 1926	9.934
	26	246 34 40.4	2 45 29.6	+ 8 2.9	−2 19 22.7	−19 9.4	9.667 5345	9.930 7594	9.927
	27	249 19 54.1	2 44 59.9	8 58.6	2 38 19.9	18 44.9	9.668 2885	9.923 2589	9.91
	28	252 4 44.4	2 44 42.7	9 49.3	2 56 52.1	18 19.3	9.668 7820	9.915 6984	9.911
	29	254 49 23.6	2 44 37.7	10 34.4	3 14 58.1	17 52.5	9.669 0153	9.908 0867	9.90
	30	257 34 3.9	2 44 44.9	11 13.7	3 32 36.8	17 24.6	9.668 9886	9.900 4344	9.89
	31	260 18 57.5	2 45 4.3	+11 46.8	−3 49 47.0	−16 55.5	9.668 7019	9.892 7543	9.88
Aug.	1	263 4 16.7	2 45 36.0	12 13.5	4 6 27.5	16 25.1	9.668 1550	9.885 0620	9.88
	2	265 50 13.7	2 46 20.0	12 33.4	4 22 36.8	15 53.2	9.667 3475	9.877 3758	9.87
	3	268 37 0.9	2 47 16.5	12 46.3	4 38 13.5	15 19.8	9.666 2788	9.869 7172	9.86
	4	271 24 50.8	2 48 25.5	12 52.0	4 53 15.9	14 44.7	9.664 9485	9.862 1118	9.85
	5	274 13 56.1	2 49 47.3	+12 50.3	−5 7 42.2	−14 7.6	9.663 3556	9.854 5895	9.85
	6	277 4 29.9	2 51 22.4	12 41.1	5 21 30.4	13 28.5	9.661 4992	9.847 1848	9.84
	7	279 56 45.4	2 53 11.0	12 24.2	5 34 38.4	12 47.1	9.659 3783	9.839 9376	9.83
	8	282 50 56.4	2 55 13.3	11 59.5	5 47 3.7	12 3.1	9.656 9919	9.832 8934	9.82
	9	285 47 16.8	2 57 29.9	11 27.0	5 58 43.6	11 16.2	9.654 3391	9.826 1036	9.82
	10	288 46 1.2	3 0 1.4	+10 46.8	−6 9 35.2	−10 26.4	9.651 4189	9.819 6264	9.81
	11	291 47 24.7	3 2 48.2	9 58.9	6 19 35.3	9 33.1	9.648 2306	9.813 5256	9.81
	12	294 51 42.8	3 5 50.8	9 3.4	6 28 40.2	8 36.0	9.644 7736	9.807 8717	9.80
	13	297 59 11.7	3 9 9.9	8 0.6	6 36 46.0	7 34.8	9.641 0479	9.802 7406	9.80
	14	301 10 8.2	3 12 46.1	6 50.8	6 43 48.4	6 29.2	9.637 0536	9.798 2133	9.79
	15	304 24 49.8	3 16 40.2	+ 5 34.5	−6 49 42.7	− 5 18.6	9.632 7916	9.794 3738	9.79
	16	*307 43 34.7*	*3 20 52.8*	+ 4 12.3	−6 54 23.8	− 4 2.6	9.628 2635	9.791 3078	9.79

MERCURY.

GREENWICH MEAN NOON.

Date.	Heliocentric Longitude, Mean Equinox of Date.	Daily Motion.	Reduction to Orbit.	Heliocentric Latitude.	Daily Motion.	Logarithm of Radius Vector.	Logarithm of Distance from Earth— At Date.	Logarithm of Distance from Earth— At Intermediate Date.
	° ′ ″	° ′ ″	′ ″	° ′ ″	′ ″			
ug. 16	307 43 34.7	3 20 52.8	+ 4 12.3	−6 54 23.8	− 4 2.6	9.628 2635	9.791 3078	9.790 0916
17	311 6 41.8	3 25 24.6	2 44.8	6 57 46.0	2 40.7	9.623 4720	9.789 1002	9.788 3437
18	314 34 30.6	3 30 16.4	+ 1 13.0	6 59 43.1	− 1 12.4	9.618 4209	9.787 8315	9.787 5729
19	318 7 21.5	3 35 28.9	− 0 22.2	7 0 8.6	+ 0 22.6	9.613 1154	9.787 5762	9.787 8490
20	321 45 35.4	3 41 2.6	1 59.4	6 58 55.5	2 4.9	9.607 5626	9.788 3981	9.789 2292
21	325 29 33.9	3 46 58.1	− 3 37.2	−6 55 56.2	+ 3 55.1	9.601 7719	9.790 3471	9.791 7554
22	329 19 39.0	3 53 15.8	5 13.8	6 51 2.7	5 53.4	9.595 7553	9.793 4567	9.795 4523
23	333 16 13.1	3 59 56.1	6 47.4	6 44 6.7	8 0.0	9.589 5276	9.797 7421	9.800 3248
24	337 19 38.8	4 6 59.0	8 15.6	6 34 59.8	10 15.3	9.583 1072	9.803 1978	9.806 3572
25	341 30 18.5	4 14 24.1	9 36.2	6 23 33.2	12 39.3	9.576 5168	9.809 7978	9.813 5134
26	345 48 34.2	4 22 10.8	−10 46.6	−6 9 38.3	+15 11.8	9.569 7837	9.817 4964	9.821 7382
27	350 14 46.9	4 30 18.0	11 43.9	5 53 6.9	17 52.3	9.562 9406	9.826 2290	9.830 9584
28	354 49 16.4	4 38 44.0	12 25.4	5 33 51.5	20 39.6	9.556 0261	9.835 9146	9.841 0855
29	359 32 20.2	4 47 26.2	12 48.4	5 11 45.9	23 32.5	9.549 0855	9.846 4585	9.852 0201
30	4 24 13.1	4 56 21.6	12 50.4	4 46 45.3	26 29.1	9.542 1710	9.857 7564	9.863 6533
31	9 25 6.3	5 5 26.0	−12 29.2	−4 18 47.3	+29 26.8	9.535 3420	9.869 6964	9.875 8709
Sept. 1	14 35 6.2	5 14 34.1	11 43.4	3 47 52.4	32 22.3	9.528 6652	9.882 1621	9.888 5552
2	19 54 13.6	5 23 39.7	10 32.3	3 14 4.9	35 11.3	9.522 2144	9.895 0357	9.901 5891
3	25 22 22.3	5 32 35.4	8 56.4	2 37 33.5	37 49.2	9.516 0693	9.908 2009	9.914 8571
4	30 59 18.3	5 41 12.7	6 57.6	1 58 31.9	40 10.8	9.510 3144	9.921 5439	9.928 2477
5	36 44 38.4	5 49 22.0	− 4 39.1	−1 17 19.3	+42 10.1	9.505 0371	9.934 9553	9.941 6541
6	42 37 49.5	5 56 53.1	− 2 5.7	−0 34 21.0	43 41.3	9.500 3254	9.948 3317	9.954 9763
7	48 38 8.3	6 3 35.4	+ 0 36.2	+0 9 52.2	44 39.0	9.496 2639	9.961 5766	9.968 1219
8	54 44 40.5	6 9 18.3	3 19.3	0 54 44.2	44 58.2	9.492 9306	9.974 6020	9.981 0072
9	60 56 21.7	6 13 51.8	5 55.2	1 39 34.7	44 35.5	9.490 3937	9.987 3285	9.993 5574
10	67 11 58.0	6 17 7.2	+ 8 15.8	+2 23 40.6	+43 28.9	9.488 7075	9.999 6863	0.005 7079
11	73 30 7.7	6 18 57.6	10 13.4	3 6 18.0	41 38.6	9.487 9091	0.011 6158	0.017 4039
12	79 49 23.3	6 19 18.5	11 41.4	3 46 44.0	39 6.8	9.488 0163	0.023 0672	0.028 6010
13	86 8 14.3	6 18 8.3	12 35.1	4 24 19.3	35 58.0	9.489 0267	0.034 0016	0.039 2656
14	92 25 10.0	6 15 28.3	12 52.3	4 58 29.6	32 17.9	9.490 9178	0.044 3904	0.049 3738
15	98 38 42.5	6 11 22.7	+12 32.8	+5 28 47.2	+28 14.0	9.493 6481	0.054 2144	0.058 9113
16	104 47 29.3	6 5 58.4	11 38.9	5 54 52.3	23 54.2	9.497 1597	0.063 4638	0.067 8720
17	110 50 16.2	5 59 24.6	10 14.7	6 16 32.8	19 26.2	9.501 3822	0.072 1364	0.076 2578
18	116 45 58.9	5 51 51.8	8 25.8	6 33 44.4	14 57.6	9.506 2354	0.080 2374	0.084 0768
19	122 33 43.9	5 43 31.3	6 18.7	6 46 30.0	10 35.1	9.511 6334	0.087 7778	0.091 3425
20	128 12 49.5	5 34 34.9	+ 3 59.9	+6 54 58.2	+ 6 23.7	9.517 4883	0.094 7732	0.098 0724
21	133 42 45.4	5 25 13.7	+ 1 36.0	6 59 22.4	+ 2 27.6	9.523 7132	0.101 2427	0.104 2869
22	139 3 12.0	5 15 38.0	− 0 47.2	6 59 59.5	− 1 10.2	9.530 2244	0.107 2079	0.110 0086
23	144 13 59.7	5 5 57.3	3 4.5	6 57 8.5	4 28.3	9.536 9434	0.112 6922	0.115 2615
24	149 15 7.5	4 56 19.4	5 11.9	6 51 9.6	7 26.0	9.543 7983	0.117 7196	0.120 0696
25	154 6 41.6	4 46 50.8	− 7 6.4	+6 42 23.3	−10 3.2	9.550 7240	0.122 3144	0.124 4570
26	158 48 54.0	4 37 36.9	8 45.6	6 31 9.7	12 20.8	9.557 6628	0.126 5005	0.128 4477
27	163 22 1.7	4 28 41.8	10 8.3	6 17 47.9	14 19.8	9.564 5643	0.130 3013	0.132 0640
28	167 46 24.9	4 20 8.4	11 13.9	6 2 35.8	16 1.7	9.571 3847	0.133 7387	0.135 3280
29	172 2 26.4	4 11 58.7	12 2.4	5 45 49.8	17 27.8	9.578 0868	0.136 8342	0.138 2598
30	176 10 30.7	4 4 14.2	−12 34.1	+5 27 45.0	−18 39.6	9 584 6394	0.139 6072	0.140 8787
ct. 1	180 11 3.3	3 56 55.4	−12 50.0	+5 8 34.8	−19 38.8	9.591 0162	0.142 0762	0.143 2019

MERCURY.

GREENWICH MEAN NOON.

Date.	Heliocentric Longitude, Mean Equinox of Date.	Daily Motion.	Reduction to Orbit.	Heliocentric Latitude.	Daily Motion.	Logarithm of Radius Vector.	Logarithm of Distance from Earth—	
							At Date.	At Intermediate Date.
	° ′ ″	° ′ ″	′ ″	° ′ ″	′ ″			
Oct. 1	180 11 3.3	3 56 55.4	−12 50.0	+5 8 34.8	−19 38.8	9.591 0162	0.142 0762	0.143 2019
2	184 4 30.1	3 50 2.5	12 51.0	4 48 31.1	20 26.9	9.597 1955	0.144 2580	0.145 2462
3	187 51 16.9	3 43 35.4	12 38.4	4 27 44.4	21 5.0	9.603 1600	0.146 1684	0.147 0262
4	191 31 49.3	3 37 33.6	12 13.4	4 6 24.1	21 34.4	9.608 8953	0.147 8214	0.148 5555
5	195 6 32.3	3 31 56.4	11 37.5	3 44 38.1	21 56.4	9.614 3902	0.149 2301	0.149 8465
6	198 35 50.0	3 26 42.9	−10 51.9	+3 22 33.6	−22 11.8	9.619 6361	0.150 4061	0.150 9102
7	202 0 5.7	3 21 52.3	9 58.1	3 0 16.5	22 21.5	9.624 6264	0.151 3599	0.151 7566
8	205 19 42.0	3 17 23.8	8 57.4	2 37 52.2	22 26.4	9.629 3559	0.152 1011	0.152 3945
9	208 35 0.4	3 13 16.3	7 50.8	2 15 25.2	22 27.1	9.633 8213	0.152 6378	0.152 8320
10	211 46 21.3	3 9 28.8	6 39.6	1 52 59.3	22 24.2	9.638 0203	0.152 9778	0.153 0760
11	214 54 4.4	3 6 0.5	− 5 24.9	+1 30 37.9	−22 18.1	9.641 9512	0.153 1274	0.153 1327
12	217 58 28.5	3 2 50.7	4 7.8	1 8 24.0	22 9.3	9.645 6133	0.153 0926	0.153 0076
13	220 59 51.6	2 59 58.3	2 49.1	0 46 20.1	21 58.2	9.649 0067	0.152 8782	0.152 7049
14	223 58 30.7	2 57 22.6	1 29.7	0 24 28.3	21 45.0	9.652 1316	0.152 4882	0.152 2286
15	226 54 42.1	2 55 2.9	− 0 10.4	+0 2 50.6	21 30.1	9.654 9885	0.151 9264	0.151 5820
16	229 48 41.7	2 52 58.7	+ 1 7.9	−0 18 31.4	−21 13.6	9.657 5783	0.151 1957	0.150 7677
17	232 40 44.5	2 51 9.4	2 24.8	0 39 36.2	20 55.7	9.659 9019	0.150 2981	0.149 7871
18	235 31 5.2	2 49 34.3	3 39.4	1 0 22.4	20 36.5	9.661 9602	0.149 2349	0.148 6415
19	238 19 57.7	2 48 13.0	4 51.2	1 20 48.9	20 16.2	9.663 7544	0.148 0071	0.147 3317
20	241 7 35.7	2 47 5.2	5 59.7	1 40 54.5	19 54.8	9.665 2853	0.146 6154	0.145 8582
21	243 54 12.4	2 46 10.5	+ 7 4.3	−2 0 38.1	−19 32.3	9.666 5538	0.145 0598	0.144 2201
22	246 40 0.9	2 45 28.6	8 4.7	2 19 58.6	19 8.7	9.667 5607	0.143 3391	0.142 4167
23	249 25 13.8	2 44 59.3	9 0.3	2 38 55.1	18 44.1	9.668 3066	0.141 4528	0.140 4471
24	252 10 3.7	2 44 42.4	9 50.8	2 57 26.5	18 18.4	9.668 7921	0.139 3992	0.138 3087
25	254 54 42.8	2 44 37.8	10 35.7	3 15 31.6	17 51.6	9.669 0174	0.137 1754	0.135 9988
26	257 39 23.4	2 44 45.4	+11 14.8	−3 33 9.4	−17 23.8	9.668 9826	0.134 7787	0.133 5147
27	260 24 17.7	2 45 5.2	11 47.8	3 50 18.8	16 54.7	9.668 6879	0.132 2063	0.130 8529
28	263 9 37.9	2 45 37.3	12 14.2	4 6 58.3	16 24.2	9.668 1331	0.129 4539	0.128 0090
29	265 55 36.4	2 46 21.7	12 33.9	4 23 6.6	15 52.3	9.667 3176	0.126 5174	0.124 9786
30	268 42 25.4	2 47 18.4	12 46.6	4 38 42.3	15 18.8	9.666 2410	0.123 3918	0.121 7564
31	271 30 17.4	2 48 27.8	+12 52.1	−4 53 43.6	−14 43.6	9.664 9026	0.120 0717	0.118 3369
Nov. 1	274 19 25.4	2 49 50.2	12 50.2	5 8 8.8	14 6.4	9.663 3016	0.116 5510	0.114 7132
2	277 10 2.2	2 51 25.6	12 40.7	5 21 55.8	13 27.2	9.661 4371	0.112 8227	0.110 8784
3	280 2 21.1	2 53 14.5	12 23.5	5 35 2.4	12 45.7	9.659 3081	0.108 8795	0.106 8251
4	282 56 35.9	2 55 17.3	11 58.6	5 47 26.3	12 1.7	9.656 9137	0.104 7141	0.102 5452
5	285 53 0.6	2 57 34.4	+11 25.9	−5 59 4.8	−11 14.8	9.654 2529	0.100 3173	0.098 0294
6	288 51 49.7	3 0 6.4	10 45.4	6 9 54.8	10 24.8	9.651 3247	0.095 6802	0.093 2685
7	291 53 18.4	3 2 53.6	9 57.2	6 19 53.2	9 31.4	9.648 1282	0.090 7930	0.088 2524
8	294 57 42.2	3 5 56.7	9 1.5	6 28 56.3	8 34.2	9.644 6631	0.085 6452	0.082 9701
9	298 5 17.2	3 9 16.3	7 58.5	6 37 0.2	7 32.9	9.640 9292	0.080 2258	0.077 4108
10	301 16 20.4	3 12 53.1	+ 6 48.5	−6 44 0.6	− 6 27.1	9.636 9268	0.074 5236	0.071 5625
11	304 31 9.3	3 16 47.7	5 32.0	6 49 52.7	5 16.3	9.632 6568	0.068 5260	0.065 4126
12	307 50 2.0	3 21 0.8	4 9.6	6 54 31.4	4 0.1	9.628 1209	0.062 2207	0.058 9488
13	311 13 17.4	3 25 33.3	2 42.0	6 57 51.0	2 38.0	9.623 3216	0.055 5951	0.052 1580
14	314 41 15.2	3 30 25.7	+ 1 10.0	6 59 45.3	− 1 9.5	9.618 2628	0.048 6359	0.045 0273
15	318 14 15.7	3 35 38.8	− 0 25.2	−7 0 7.8	+ 0 25.7	9.612 9498	0.041 3304	0.037 5437
16	321 52 39.8	3 41 13.1	− 2 2.5	−6 58 51.5	+ 2 8.2	9.607 3902	0.033 6658	0.029 6951

MERCURY.

GREENWICH MEAN NOON.

Date.	Heliocentric Longitude, Mean Equinox of Date.	Daily Motion.	Reduction to Orbit.	Heliocentric Latitude.	Daily Motion.	Logarithm of Radius Vector.	Logarithm of Distance from Earth—	
							At Date.	At Intermediate Date.
	° ′ ″	° ′ ″	′ ″	° ′ ″	′ ″			
Nov. 16	321 52 39.8	3 41 13.1	− 2 2.5	−6 58 51.5	+ 2 8.2	9.607 3902	0.033 6658	0.029 6951
17	325 36 49.2	3 47 9.3	3 40.2	6 55 48.8	3 58.5	9.601 5927	0.025 6305	0.021 4705
18	329 27 5.8	3 53 27.7	5 16.8	6 50 51.7	5 57.1	9.595 5696	0.017 2141	0.012 8603
19	333 23 52.1	4 0 8.7	6 50.2	6 43 51.8	8 4.1	9.589 3361	0.008 4083	0.003 8575
20	337 27 30.7	4 7 12.2	8 18.3	6 34 40.6	10 19.7	9.582 9106	9.999 2077	9.994 4588
21	341 38 23.9	4 14 37.9	− 9 38.6	−6 23 9.5	+12 44.0	9.576 3157	9.989 6111	9.984 6653
22	345 56 53.6	4 22 25.2	10 48.6	6 9 9.9	15 16.6	9.569 5791	9.979 6227	9.974 4853
23	350 23 21.0	4 30 33.0	11 45.5	5 52 33.6	17 57.1	9.562 7336	9.969 2553	9.963 9358
24	354 58 5.7	4 38 59.4	12 26.5	5 33 13.1	20 44.8	9.555 8181	9.958 5306	9.953 0445
25	359 41 25.2	4 47 42.1	12 48.8	5 11 2.1	23 38.0	9.548 8780	9.947 4834	9.941 8540
26	4 33 34.2	4 56 37.8	−12 50.1	−4 45 56.0	+26 34.7	9.541 9656	9.936 1647	9.930 4247
27	9 34 43.7	5 5 42.3	12 28.2	4 17 52.5	29 32.3	9.535 1407	9.924 6452	9.918 8386
28	14 45 0.0	5 14 50.4	11 41.6	3 46 52.3	32 27.5	9.528 4702	9.913 0192	9.907 2030
29	20 4 23.6	5 23 55.8	10 29.7	3 12 59.7	35 16.3	9.522 0279	9.901 4083	9.895 6552
30	25 32 48.2	5 32 51.0	8 53.1	2 36 23.5	37 53.8	9.515 8937	9.889 9659	9.884 3646
Dec. 1	31 9 59.4	5 41 27.5	− 6 53.6	−1 57 17.6	+40 14.8	9.510 1524	9.878 8775	9.873 5330
2	36 55 33.8	5 49 35.8	4 34.5	1 16 1.4	42 13.3	9.504 8913	9.868 3611	9.863 3935
3	42 48 58.1	5 57 5.5	− 2 0.8	−0 33 0.4	43 43.6	9.500 1983	9.858 6629	9.854 2029
4	48 49 28.5	6 3 46.1	+ 0 41.2	+0 11 14.5	44 40.1	9.496 1580	9.850 0476	9.846 2306
5	54 56 10.5	6 9 27.0	3 24.2	0 56 7.0	44 58.1	9.492 8482	9.842 7847	9.839 7410
6	61 7 59.3	6 13 58.3	+ 5 59.8	+1 40 56.7	+44 34.0	9.490 3365	9.837 1281	9.834 9715
7	67 23 40.9	6 17 11.2	8 19.8	2 25 0.4	43 26.0	9.488 6767	9.833 2930	9.832 1100
8	73 41 53.3	6 18 59.0	10 16.5	3 7 34.3	41 34.5	9.487 9056	9.831 4347	9.831 2742
9	80 1 9.0	6 19 17.2	11 43.5	3 47 55.7	39 1.5	9.488 0402	9.831 6297	9.832 4971
10	86 19 57.3	6 18 4.3	12 36.2	4 25 25.1	35 51.5	9.489 0775	9.833 8665	9.835 7229
11	92 36 47.6	6 15 21.6	+12 52.2	+4 59 28.6	+32 10.7	9.490 9943	9.838 0467	9.840 8141
12	98 50 12.0	6 11 13.5	12 31.6	5 29 38.8	28 6.3	9.493 7488	9.843 9978	9.847 5676
13	104 58 48.5	6 5 47.1	11 36.7	5 55 35.9	23 46.0	9.497 2829	9.851 4917	9.855 7367
14	111 1 23.1	5 59 11.4	10 11.7	6 17 8.2	19 17.9	9.501 5254	9.860 2687	9.865 0540
15	116 56 51.7	5 51 36.9	8 22.2	6 34 11.6	14 49.5	9.506 3957	9.870 0592	9.875 2522
16	122 44 21.2	5 43 15.3	+ 6 14.6	+6 46 49.2	+10 27.2	9.511 8082	9.880 6023	9.886 0802
17	128 23 10.3	5 34 18.0	3 55.6	6 55 9.7	6 16.3	9.517 6751	9.891 6586	9.897 3124
18	133 52 49.0	5 24 56.2	+ 1 31.6	6 59 26.8	+ 2 20.8	9.523 9094	9.903 0185	9.908 7557
19	139 12 58.0	5 15 20.3	− 0 51.4	6 59 57.3	− 1 16.5	9.530 4276	9.914 5050	9.920 2494
20	144 23 28.0	5 5 39.6	3 8.5	6 57 0.3	4 34.0	9.537 1513	9.925 9738	9.931 6648
21	149 24 18.2	4.56 2.0	− 5 15.6	+6 50 56.0	− 7 31.1	9.544 0088	9.937 3106	9.942 9012
22	154 15 35.0	4 46 33.8	7 9.6	6 42 4.9	10 7.7	9.550 9354	9.948 4279	9.953 8831
23	158 57 30.7	4 37 20.4	8 48.4	6 30 47.1	12 24.7	9.557 8734	9.959 2608	9.964 5556
24	163 30 22.2	4 28 25.9	10 10.6	6 17 21.7	14 23.2	9.564 7725	9.969 7632	9.974 8801
25	167 54 29.8	4 19 53.2	11 15.7	6 2 6.5	16 4.5	9.571 5895	9.979 9037	9.984 8319
26	172 10 16.5	4 11 44.3	−12 3.6	+5 45 17.9	−17 30.2	9.578 2873	9.989 6632	9.994 3967
27	176 18 6.8	4 4 0.6	12 34.8	5 27 10.9	18 41.7	9.584 8346	9.999 0319	0.003 5686
28	180 18 26.3	3 56 42.6	12 50.2	5 7 58.9	19 40.5	9.591 2054	0.008 0069	0.012 3472
29	184 11 40.7	3 49 50.5	12 50.8	4 47 53.7	20 28.1	9.597 3783	0.016 5902	0.020 7368
30	187 58 15.9	3 43 24.2	12 37.8	4 27 5.9	21 6.0	9.603 3358	0.024 7883	0.028 7458
31	191 38 37.5	3 37 23.2	−12 12.5	+4 5 44.6	−21 35.2	9.609 0637	0.032 6106	0.036 3838
32	195 13 10.4	3 31 46.7	−11 36.2	+3 43 58.0	−21 56.9	9.614 5512	0.040 0670	0.043 6620

VENUS.

GREENWICH MEAN NOON.

Date.		Heliocentric Longitude, Mean Equinox of Date.	Daily Motion.	Reduction to Orbit.	Heliocentric Latitude.	Daily Motion.	Logarithm of Radius Vector.	Logarithm of Distance from Earth— At Date.	Logarithm of Distance from Earth— At Intermediate Date.
		° ′ ″	° ′ ″	′ ″	° ′ ″	′ ″			
Jan.	1	165 30 56.8	1 37 22.7	+0 2.3	+3 23 37.2	+0 2.3	9.856 9079	9.978 2824	9.981 5313
	3	168 45 39.7	1 37 20.0	−0 18.1	3 23 22.1	−0 17.3	9.857 0071	9.984 7482	9.987 9333
	5	172 0 16.8	1 37 17.0	0 38.3	3 22 28.0	0 36.7	9.857 1136	9.991 0868	9.994 2090
	7	175 14 47.5	1 37 13.6	0 58.0	3 20 55.2	0 56.0	9.857 2271	9.997 3003	0.000 3608
	9	178 29 11.2	1 37 10.0	1 17.0	3 18 43.9	1 15.1	9.857 3472	0.003 3907	0.006 3902
	11	181 43 27.4	1 37 6.1	−1 35.0	+3 15 54.7	−1 33.9	9.857 4735	0.009 3597	0.012 2994
	13	184 57 35.4	1 37 1.9	1 51.7	3 12 28.2	1 52.4	9.857 6056	0.015 2098	0.018 0911
	15	188 11 34.7	1 36 57.4	2 7.0	3 8 25.1	2 10.5	9.857 7431	0.020 9435	0.023 7674
	17	191 25 24.9	1 36 52.8	2 20.7	3 3 46.3	2 28.2	9.857 8855	0.026 5632	0.029 3313
	19	194 39 5.6	1 36 47.9	2 32.6	2 58 32.7	2 45.3	9.858 0324	0.032 0721	0.034 7859
	21	197 52 36.4	1 36 42.9	−2 42.6	+2 52 45.4	−3 1.8	9.858 1833	0.037 4731	0.040 1341
	23	201 5 57.0	1 36 37.7	2 50.5	2 46 25.7	3 17.7	9.858 3376	0.042 7692	0.045 3789
	25	204 19 7.1	1 36 32.4	2 56.2	2 39 34.8	3 33.0	9.858 4950	0.047 9635	0.050 5234
	27	207 32 6.5	1 36 27.0	2 59.7	2 32 14.0	3 47.6	9.858 6549	0.053 0591	0.055 5710
	29	210 44 55.1	1 36 21.5	3 1.0	2 24 24.8	4 1.4	9.858 8169	0.058 0594	0.060 5245
	31	213 57 32.7	1 36 16.0	−3 0.0	+2 16 8.8	−4 14.4	9.858 9803	0.062 9667	0.065 3862
Feb.	2	217 9 59.4	1 36 10.6	2 56.7	2 7 27.6	4 26.6	9.859 1448	0.067 7834	0.070 1583
	4	220 22 15.1	1 36 5.1	2 51.2	1 58 22.9	4 37.9	9.859 3097	0.072 5112	0.074 8421
	6	223 34 19.9	1 35 59.7	2 43.6	1 48 56.5	4 48.3	9.859 4746	0.077 1512	0.079 4386
	8	226 46 14.0	1 35 54.3	2 34.0	1 39 10.1	4 57.8	9.859 6389	0.081 7043	0.083 9486
	10	229 57 57.4	1 35 49.1	−2 22.4	+1 29 5.6	−5 6.4	9.859 8022	0.086 1716	0.088 3734
	12	233 9 30.5	1 35 44.0	2 9.1	1 18 45.0	5 14.0	9.859 9639	0.090 5541	0.092 7141
	14	236 20 53.5	1 35 39.0	1 54.2	1 8 10.2	5 20.6	9.860 1235	0.094 8535	0.096 9725
	16	239 32 6.7	1 35 34.2	1 37.9	0 57 23.3	5 26.2	9.860 2806	0.099 0712	0.101 1499
	18	242 43 10.5	1 35 29.6	1 20.4	0 46 26.2	5 30.8	9.860 4346	0.103 2088	0.105 2482
	20	245 54 5.2	1 35 25.2	−1 1.9	+0 35 20.9	−5 34.4	9.860 5851	0.107 2683	0.109 2693
	22	249 4 51.3	1 35 21.0	0 42.6	0 24 9.6	5 36.9	9.860 7316	0.111 2515	0.113 2151
	24	252 15 29.3	1 35 17.1	0 22.9	0 12 54.2	5 38.4	9.860 8737	0.115 1605	0.117 0878
	26	255 25 59.7	1 35 13.4	−0 2.9	+0 1 36.9	5 38.8	9.861 0110	0.118 9973	0.120 8892
	28	258 36 23.0	1 35 10.0	+0 17.2	−0 9 40.3	5 38.2	9.861 1430	0.122 7638	0.124 6212
Mar.	1	261 46 39.6	1 35 6.8	+0 37.0	−0 20 55.3	−5 36.6	9.861 2693	0.126 4617	0.128 2853
	3	264 56 50.2	1 35 3.9	0 56.3	0 32 6.1	5 34.0	9.861 3896	0.130 0922	0.131 8824
	5	268 6 55.4	1 35 1.3	1 15.0	0 43 10.6	5 30.4	9.861 5035	0.133 6561	0.135 4133
	7	271 16 55.7	1 34 59.0	1 32.7	0 54 6.9	5 25.7	9.861 6107	0.137 1539	0.138 8780
	9	274 26 51.6	1 34 57.0	1 49.3	1 4 52.9	5 20.1	9.861 7108	0.140 5857	0.142 2769
	11	277 36 43.8	1 34 55.3	+2 4.6	−1 15 26.8	−5 13.6	9.861 8035	0.143 9517	0.145 6102
	13	280 46 32.9	1 34 53.9	2 18.3	1 25 46.7	5 6.1	9.861 8886	0.147 2525	0.148 8787
	15	283 56 19.5	1 34 52.8	2 30.3	1 35 50.6	4 57.7	9.861 9658	0.150 4887	0.152 0826
	17	287 6 4.0	1 34 51.9	2 40.5	1 45 36.8	4 48.4	9.862 0349	0.153 6606	0.155 2227
	19	290 15 47.0	1 34 51.3	2 48.7	1 55 3.6	4 38.2	9.862 0956	0.156 7691	0.158 2998
	21	293 25 29.1	1 34 51.0	+2 54.9	−2 4 9.2	−4 27.2	9.862 1478	0.159 8150	0.161 3148
	23	296 35 10.9	1 34 50.9	2 59.0	2 12 52.1	4 15.4	9.862 1914	0.162 7995	0.164 2692
	25	299 44 52.8	1 34 51.1	3 0.9	2 21 10.6	4 2.9	9.862 2262	0.165 7240	0.167 1640
	27	302 54 35.2	1 34 51.5	3 0.6	2 29 3.3	3 49.7	9.862 2521	0.168 5894	0.170 0003
	29	306 4 18.8	1 34 52.2	2 58.0	2 36 28.8	3 35.7	9.862 2690	0.171 3969	0.172 7793
	31	309 14 3.9	1 34 53.0	+2 53.3	−2 43 25.7	−3 21.1	9.862 2769	0.174 1476	0.175 5018
r.	2	312 23 50.9	1 34 54.1	+2 46.5	−2 49 52.7	−3 5.8	9.862 2757	0.176 8419	0.178 1678

VENUS.

GREENWICH MEAN NOON.

Date.		Heliocentric Longitude, Mean Equinox of Date.	Daily Motion.	Reduction to Orbit.	Heliocentric Latitude.	Daily Motion.	Logarithm of Radius Vector.	Logarithm of Distance from Earth—	
								At Date.	At Intermediate Date.
		° ′ ″	° ′ ″	′ ″	° ′ ″	′ ″			
Apr.	2	312 23 50.9	1 34 54.1	+2 46.5	−2 49 52.7	−3 5.8	9.862 2757	0.176 8419	0.178 1678
	4	315 33 40.2	1 34 55.3	2 37.7	2 55 48.7	2 50.1	9.862 2654	0.179 4796	0.180 7773
	6	318 43 32.3	1 34 56.8	2 27.0	3 1 12.7	2 33.8	9.862 2462	0.182 0608	0.183 3300
	8	321 53 27.4	1 34 58.4	2 14.4	3 6 3.6	2 17.0	9.862 2180	0.184 5849	0.185 8256
	10	325 3 25.8	1 35 0.1	2 0.2	3 10 20.5	1 59.8	9.862 1809	0.187 0521	0.188 2642
	12	328 13 27.8	1 35 2.0	+1 44.6	−3 14 2.7	−1 42.3	9.862 1351	0.189 4618	0.190 6450
	14	331 23 33.8	1 35 4.0	1 27.7	3 17 9.4	1 24.4	9.862 0806	0.191 8139	0.192 9684
	16	334 33 43.9	1 35 6.1	1 9.7	3 19 40.1	1 6.2	9.862 0176	0.194 1085	0.195 2342
	18	337 43 58.4	1 35 8.4	0 50.8	3 21 34.2	0 47.8	9.861 9464	0.196 3455	0.197 4426
	20	340 54 17.5	1 35 10.7	0 31.3	3 22 51.4	0 29.3	9.861 8671	0.198 5254	0.199 5940
	22	344 4 41.3	1 35 13.1	+0 11.4	−3 23 31.4	−0 10.7	9.861 7800	0.200 6485	0.201 6890
	24	347 15 10.1	1 35 15.6	−0 8.6	3 23 34.1	+0 8.0	9.861 6852	0.202 7157	0.203 7287
	26	350 25 44.0	1 35 18.2	0 28.5	3 22 59.3	0 26.7	9.861 5832	0.204 7279	0.205 7134
	28	353 36 23.0	1 35 20.8	0 48.1	3 21 47.1	0 45.4	9.861 4742	0.206 6854	0.207 6438
	30	356 47 7.4	1 35 23.5	1 7.1	3 19 57.7	1 3.9	9.861 3585	0.208 5886	0.209 5198
May	2	359 57 57.3	1 35 26.3	−1 25.3	−3 17 31.4	+1 22.3	9.861 2365	0.210 4373	0.211 3412
	4	3 8 52.7	1 35 29.1	1 42.5	3 14 28.6	1 40.4	9.861 1085	0.212 2313	0.213 1076
	6	6 19 53.7	1 35 31.9	1 58.4	3 10 49.7	1 58.3	9.860 9750	0.213 9701	0.214 8187
	8	9 31 0.4	1 35 34.8	2 12.8	3 6 35.4	2 15.9	9.860 8363	0.215 6533	0.216 4739
	10	12 42 13.0	1 35 37.8	2 25.7	3 1 46.4	2 33.1	9.860 6928	0.217 2803	0.218 0725
	12	15 53 31.5	1 35 40.8	−2 36.7	−2 56 23.5	+2 49.8	9.860 5451	0.218 8505	0.219 6141
	14	19 4 56.0	1 35 43.8	2 45.8	2 50 27.6	3 6.0	9.860 3935	0.220 3633	0.221 0980
	16	22 16 26.5	1 35 46.8	2 52.8	2 43 59.8	3 21.7	9.860 2385	0.221 8182	0.222 5240
	18	25 28 3.2	1 35 49.9	2 57.7	2 37 1.2	3 36.8	9.860 0806	0.223 2154	0.223 8923
	20	28 39 46.1	1 35 53.0	3 0.4	2 29 33.1	3 51.2	9.859 9203	0.224 5547	0.225 2026
	22	31 51 35.3	1 35 56.2	−3 0.9	−2 21 36.8	+4 5.0	9.859 7580	0.225 8362	0.226 4555
	24	35 3 30.9	1 35 59.4	2 59.1	2 13 13.6	4 18.0	9.859 5943	0.227 0607	0.227 6519
	26	38 15 33.0	1 36 2.7	2 55.1	2 4 25.1	4 30.3	9.859 4297	0.228 2290	0.228 7919
	28	41 27 41.6	1 36 6.0	2 48.9	1 55 13.0	4 41.8	9.859 2646	0.229 3407	0.229 8755
	30	44 39 56.9	1 36 9.3	2 40.6	1 45 38.8	4 52.3	9.859 0997	0.230 3962	0.230 9029
June	1	47 52 18.9	1 36 12.7	−2 30.2	−1 35 44.4	+5 1.9	9.858 9354	0.231 3955	0.231 8739
	3	51 4 47.8	1 36 16.2	2 18.0	1 25 31.6	5 10.7	9.858 7722	0.232 3381	0.232 7880
	5	54 17 23.6	1 36 19.6	2 4.0	1 15 2.2	5 18.5	9.858 6107	0.233 2236	0.233 6447
	7	57 30 6.3	1 36 23.1	1 48.5	1 4 18.2	5 25.3	9.858 4514	0.234 0514	0.234 4436
	9	60 42 56.1	1 36 26.7	1 31.5	0 53 21.6	5 31.1	9.858 2947	0.234 8212	0.235 1841
	11	63 55 53.1	1 36 30.3	−1 13.4	−0 42 14.5	+5 35.9	9.858 1412	0.235 5321	0.235 8652
	13	67 8 57.2	1 36 33.8	0 54.4	0 30 58.9	5 39.6	9.857 9914	0.236 1835	0.236 4868
	15	70 22 8.4	1 36 37.4	0 34.7	0 19 37.0	5 42.2	9.857 8457	0.236 7751	0.237 0483
	17	73 35 26.9	1 36 41.0	−0 14.5	−0 8 10.9	5 43.7	9.857 7047	0.237 3065	0.237 5496
	19	76 48 52.6	1 36 44.6	+0 5.8	+0 3 17.2	5 44.1	9.857 5687	0.237 7778	0.237 9912
	21	80 2 25.6	1 36 48.2	+0 26.1	+0 14 45.1	+5 43.5	9.857 4382	0.238 1897	0.238 3735
	23	83 16 5.7	1 36 51.8	0 46.1	0 26 10.6	5 41.8	9.857 3137	0.238 5427	0.238 6973
	25	86 29 52.9	1 36 55.3	1 5.5	0 37 31.4	5 38.9	9.857 1955	0.238 8374	0.238 9630
	27	89 43 47.0	1 36 58.8	1 24.1	0 48 45.5	5 35.0	9.857 0841	0.239 0739	0.239 1703
	29	92 57 48.0	1 37 2.2	1 41.7	0 59 50.6	5 30.0	9.856 9797	0.239 2524	0.239 3200
July	1	96 11 55.7	1 37 5.5	+1 57.9	+1 10 44.6	+5 23.9	9.856 8828	0.239 3731	0.239 4117
	3	99 26 9.9	1 37 8.7	+2 12.6	+1 21 25.3	+5 16.7	9.856 7936	0.239 4358	0.239 4453

VENUS.

GREENWICH MEAN NOON.

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								At Date.	At Intermediate Date.
		° ′ ″	° ′ ″	′ ″	° ′ ″	′ ″			
July	1	96 11 55.7	1 37 5.5	+1 57.9	+1 10 44.6	+5 23.9	9.856 8828	0.239 3731	0.239 4117
	3	99 26 9.9	1 37 8.7	2 12.6	1 21 25.3	5 16.7	9.856 7936	0.239 4358	0.239 4453
	5	102 40 30.4	1 37 11.8	2 25.7	1 31 50.6	5 8.5	9.856 7125	0.239 4403	0.239 4206
	7	105 54 56.8	1 37 14.7	2 36.9	1 41 58.6	4 59.3	9.856 6396	0.239 3861	0.239 3369
	9	109 9 28.9	1 37 17.4	2 46.1	1 51 47.2	4 49.1	9.856 5753	0.239 2729	0.239 1940
	11	112 24 6.4	1 37 20.0	+2 53.2	+2 1 14.5	+4 38.0	9.856 5198	0.239 1001	0.238 9912
	13	115 38 48.9	1 37 22.4	2 58.0	2 10 18.6	4 25.9	9.856 4733	0.238 8673	0.238 7283
	15	118 53 35.9	1 37 24.5	3 0.6	2 18 57.8	4 13.0	9.856 4358	0.238 5743	0.238 4052
	17	122 8 26.9	1 37 26.4	3 0.9	2 27 10.3	3 59.3	9.856 4075	0.238 2210	0.238 0219
	19	125 23.21.6	1 37 28.1	2 58.8	2 34 54.5	3 44.8	9.856 3886	0.237 8078	0.237 5789
	21	128 38 19.4	1 37 29.5	+2 54.4	+2 42 8.9	+3 29.5	9.856 3790	0.237 3353	0.237 0772
	23	131 53 19.6	1 37 30.6	2 47.8	2 48 52.1	3 13.6	9.856 3789	0.236 8045	0.236 5173
	25	135 8 21.7	1 37 31.4	2 39.0	2 55 2.7	2 57.0	9.856 3882	0.236 2157	0.235 8997
	27	138 23 25.1	1 37 31.9	2 28.2	3 0 39.6	2 39.8	9.856 4068	0.235 5693	0.235 2248
	29	141 38 29.2	1 37 32.1	2 15.5	3 5 41.6	2 22.1	9.856 4347	0.234 8662	0.234 4934
	31	144 53 33.3	1 37 31.9	+2 1.0	+3 10 7.8	+2 4.0	9.856 4718	0.234 1064	0.233 7053
Aug.	2	148 8 36.7	1 37 31.3	1 45.0	3 13 57.3	1 45.4	9.856 5181	0.233 2900	0.232 8606
	4	151 23 38.6	1 37 30.5	1 27.7	3 17 9.3	1 26.5	9.856 5733	0.232 4170	0.231 9593
	6	154 38 38.5	1 37 29.3	1 9.2	3 19 43.3	1 7.4	9.856 6372	0.231 4874	0.231 0013
	8	157 53 35.6	1 37 27.7	0 49.9	3 21 38.9	0 48.1	9.856 7097	0.230 5008	0.229 9860
	10	161 8 29.3	1 37 25.8	+0 29.9	+3 22 55.6	+0 28.6	9.856 7905	0.229 4567	0.228 9129
	12	164 23 18.7	1 37 23.5	+0 9.5	3 23 33.3	+0 9.1	9.856 8793	0.228 3546	0.227 7819
	14	167 38 3.2	1 37 20.9	−0 11.0	3 23 31.9	−0 10.5	9.856 9759	0.227 1947	0.226 5930
	16	170 52 42.2	1 37 18.0	0 31.3	3 22 51.4	0 30.0	9.857 0799	0.225 9769	0.225 3466
	18	174 7 15.1	1 37 14.7	0 51.2	3 21 32.0	0 49.3	9.857 1910	0.224 7020	0.224 0432
	20	177 21 41.1	1 37 11.1	−1 10.5	+3 19 34.1	−1 8.5	9.857 3088	0.223 3705	0.222 6838
	22	180 35 59.7	1 37 7.3	1 28.8	3 16 58.1	1 27.4	9.857 4330	0.221 9832	0.221 2689
	24	183 50 10.4	1 37 3.2	1 46.0	3 13 44.6	1 46.0	9.857 5631	0.220 5409	0.219 7993
	26	187 4 12.6	1 36 58.9	2 1.9	3 9 54.2	2 4.3	9.857 6987	0.219 0441	0.218 2754
	28	190 18 5.8	1 36 54.3	2 16.2	3 5 27.7	2 22.1	9.857 8393	0.217 4932	0.216 6976
	30	193 31 49.7	1 36 49.5	−2 28.7	+3 0 26.2	−2 39.4	9.857 9846	0.215 8886	0.215 0663
Sept.	1	196 45 23.8	1 36 44.5	2 39.4	2 54 50.6	2 56.1	9.858 1341	0.214 2307	0.213 3817
	3	199 58 47.8	1 36 39.4	2 48.0	2 48 42.1	3 12.2	9.858 2873	0.212 5194	0.211 6437
	5	203 12 1.4	1 36 34.2	2 54.5	2 42 2.0	3 27.7	9.858 4436	0.210 7544	0.209 8515
	7	206 25 4.4	1 36 28.8	2 58.8	2 34 51.5	3 42.6	9.858 6026	0.208 9350	0.208 0049
	9	209 37 56.6	1 36 23.4	−3 0.8	+2 27 12.1	−3 56.7	9.858 7638	0.207 0612	0.206 1037
	11	212 50 37.9	1 36 17.9	3 0.6	2 19 5.3	4 10.0	9.858 9266	0.205 1323	0.204 1470
	13	216 3 8.2	1 36 12.4	2 58.1	2 10 32.7	4 22.4	9.859 0906	0.203 1478	0.202 1348
	15	219 15 27.6	1 36 6.9	2 53.4	2 1 36.0	4 34.0	9.859 2553	0.201 1080	0.200 0673
	17	222 27 36.0	1 36 1.5	2 46.5	1 52 17.0	4 44.8	9.859 4202	0.199 0131	0.197 9452
	19	225 39 33.6	1 35 56.2	−2 37.6	+1 42 37.4	−4 54.7	9.859 5846	0.196 8638	0.195 7689
	21	228 51 20.6	1 35 50.9	2 26.6	1 32 39.0	5 3.6	9.859 7481	0.194 6607	0.193 5390
	23	232 2 57.2	1 35 45.7	2 13.9	1 22 23.8	5 11.5	9.859 9103	0.192 4039	0.191 2556
	25	235 14 23.5	1 35 40.7	1 59.6	1 11 53.8	5 18.4	9.860 0705	0.190 0941	0.188 9194
	27	238 25 39.9	1 35 35.8	1 43.7	1 1 10.9	5 24.4	9.860 2283	0.187 7315	0.186 5305
	29	241 36 46.8	1 35 31.2	−1 26.5	+0 50 17.1	−5 29.3	9.860 3833	0.185 3163	0.184 0890
Oct.	1	244 47 44.6	1 35 26.7	−1 8.4	+0 39 14.5	−5 33.2	9.860 5349	0.182 8485	0.181 5947

VENUS.

GREENWICH MEAN NOON.

Date.		Heliocentric Longitude, Mean Equinox of Date.	Daily Motion.	Reduction to Orbit.	Heliocentric Latitude.	Daily Motion.	Logarithm of Radius Vector.	Logarithm of Distance from Earth—	
								At Date.	At Intermediate Date.
		° ′ ″	° ′ ″	′ ″	° ′ ″	′ ″			
Oct.	1	244 47 44.6	1 35 26.7	−1 8.4	+0 39 14.5	−5 33.2	9.860 5349	0.182 8485	0.181 5947
	3	247 58 33.6	1 35 22.4	0 49.4	0 28 5.0	5 36.1	9.860 6827	0.180 3276	0.179 0471
	5	251 9 14.3	1 35 18.4	0 29.8	0 16 50.8	5 38.0	9.860 8262	0.177 7531	0.176 4455
	7	254 19 47.2	1 35 14.6	−0 9.9	+0 5 34.0	5 38.8	9.860 9651	0.175 1241	0.173 7888
	9	257 30 12.8	1 35 11.1	+0 10.2	−0 5 43.5	5 38.6	9.861 0988	0.172 4394	0.171 0762
	11	260 40 31.7	1 35 7.9	+0 30.1	−0 16 59.5	−5 37.3	9.861 2269	0.169 6986	0.168 3066
	13	263 50 44.3	1 35 4.9	0 49.6	0 28 12.0	5 35.0	9.861 3492	0.166 9003	0.165 4797
	15	267 0 51.3	1 35 2.2	1 8.6	0 39 18.9	5 31.8	9.861 4652	0.164 0446	0.162 5950
	17	270 10 53.2	1 34 59.8	1 26.7	0 50 18.3	5 27.5	9.861 5746	0.161 1312	0.159 6530
	19	273 20 50.6	1 34 57.7	1 43.7	1 1 8.2	5 22.2	9.861 6770	0.158 1604	0.156 6532
	21	276 30 44.1	1 34 55.9	+1 59.4	−1 11 46.5	−5 16.0	9.861 7722	0.155 1316	0.153 5956
	23	279 40 34.2	1 34 54.4	2 13.7	1 22 11.5	5 8.8	9.861 8598	0.152 0452	0.150 4804
	25	282 50 21.6	1 34 53.1	2 26.3	1 32 21.2	5 0.7	9.861 9397	0.148 9012	0.147 3076
	27	286 0 6.8	1 34 52.2	2 37.2	1 42 13.8	4 51.7	9.862 0115	0.145 6995	0.144 0769
	29	289 9 50.3	1 34 51.5	2 46.1	1 51 47.6	4 41.9	9.862 0750	0.142 4397	0.140 7879
	31	292 19 32.7	1 34 51.1	+2 53.0	−2 1 0.9	−4 31.2	9.862 1301	0.139 1212	0.137 4396
Nov.	2	295 29 14.6	1 34 50.9	2 57.8	2 9 51.9	4 19.7	9.862 1766	0.135 7430	0.134 0311
	4	298 38 56.4	1 34 51.0	3 0.5	2 18 19.1	4 7.4	9.862 2143	0.132 3038	0.130 5608
	6	301 48 38.6	1 34 51.3	3 1.0	2 26 21.0	3 54.4	9.862 2432	0.128 8020	0.127 0270
	8	304 58 21.8	1 34 51.9	2 59.2	2 33 56.1	3 40.7	9.862 2631	0.125 2357	0.123 4278
	10	308 8 6.4	1 34 52.7	+2 55.2	−2 41 3.1	−3 26.3	9.862 2740	0.121 6033	0.119 7619
	12	311 17 52.8	1 34 53.7	2 49.1	2 47 40.8	3 11.3	9.862 2759	0.117 9035	0.116 0280
	14	314 27 41.3	1 34 54.9	2 41.0	2 53 47.8	2 55.7	9.862 2688	0.114 1354	0.112 2254
	16	317 37 32.4	1 34 56.3	2 30.9	2 59 23.1	2 39.6	9.862 2526	0.110 2979	0.108 3529
	18	320 47 26.4	1 34 57.8	2 19.0	3 4 25.7	2 22.9	9.862 2274	0.106 3902	0.104 4097
	20	323 57 23.7	1 34 59.5	+2 5.4	−3 8 54.6	−2 5.8	9.862 1933	0.102 4114	0.100 3953
	22	327 7 24.6	1 35 1.4	1 50.2	3 12 49.0	1 48.4	9.862 1505	0.098 3612	0.096 3089
	24	330 17 29.2	1 35 3.3	1 33.7	3 16 8.2	1 30.7	9.862 0990	0.094 2385	0.092 1499
	26	333 27 37.9	1 35 5.4	1 16.1	3 18 51.6	1 12.6	9.862 0389	0.090 0430	0.087 9175
	28	336 37 50.9	1 35 7.6	0 57.5	3 20 58.5	0 54.3	9.861 9705	0.085 7733	0.083 6102
	30	339 48 8.5	1 35 9.9	+0 38.2	−3 22 28.6	−0 35.8	9.861 8940	0.081 4281	0.079 2266
Dec.	2	342 58 30.8	1 35 12.3	+0 18.4	3 23 21.7	−0 17.2	9.861 8095	0.077 0054	0.074 7642
	4	346 8 57.9	1 35 14.8	−0 1.6	3 23 37.4	+0 1.5	9.861 7172	0.072 5027	0.070 2205
	6	349 19 30.0	1 35 17.4	0 21.6	3 23 15.7	0 20.2	9.861 6176	0.067 9173	0.065 5928
	8	352 30 7.4	1 35 20.0	0 41.3	3 22 16.6	0 38.9	9.861 5109	0.063 2466	0.060 8784
	10	355 40 50.0	1 35 22.6	−1 0.6	−3 20 40.2	+0 57.5	9.861 3974	0.058 4880	0.056 0749
	12	358 51 38.0	1 35 25.3	1 19.1	3 18 26.8	1 15.9	9.861 2774	0.053 6390	0.051 1799
	14	2 2 31.5	1 35 28.1	1 36.6	3 15 36.7	1 34.1	9.861 1513	0.048 6975	0.046 1914
	16	5 13 30.6	1 35 31.0	1 53.0	3 12 10.4	1 52.1	9.861 0196	0.043 6613	0.041 1070
	18	8 24 35.5	1 35 33.9	2 8.0	3 8 8.4	2 9.8	9.860 8826	0.038 5283	0.035 9249
	20	11 35 46.2	1 35 36.8	−2 21.4	−3 3 31.4	+2 27.1	9.860 7406	0.033 2968	0.030 6438
	22	14 47 2.7	1 35 39.7	2 33.1	2 58 20.2	2 44.0	9.860 5942	0.027 9655	0.025 2618
	24	17 58 25.1	1 35 42.7	2 42.8	2 52 35.7	3 0.4	9.860 4437	0.022 5325	0.019 7771
	26	21 9 53.6	1 35 45.8	2 50.6	2 46 19.0	3 16.2	9.860 2897	0.016 9955	0.014 1876
	28	24 21 28.3	1 35 48.9	2 56.3	2 39 31.1	3 31.5	9.860 1326	0.011 3530	0.008 4912
	30	27 33 9.2	1 35 52.0	−2 59.8	−2 32 13.1	+3 46.3	9.859 9729	0.005 6018	0.002 6843
	32	30 44 56.3	1 35 55.1	−3 1.0	−2 24 26.4	+4 0.3	9.859 8111	9.999 7382	9.996 7632

MARS.

GREENWICH MEAN NOON.

Date.	Heliocentric Longitude, Mean Equinox of Date.	Daily Motion.	Reduction to Orbit.	Heliocentric Latitude	Daily Motion.	Logarithm of Radius Vector.	Logarithm of Distance from Earth— At Date.	Logarithm of Distance from Earth— At Intermediate Date.
	° ′ ″	′ ″	″	° ′ ″	″			
Jan. 0	80 39 41.9	30 13.13	+48.2	+0 58 29.3	+49.78	0.190 5334	9.837 2654	9.841 9039
2	81 40 2.3	30 7.32	49.0	1 0 8.1	49.07	0.191 2335	9.846 5580	9.851 2240
4	82 40 11.2	30 1.58	49.7	1 1 45.5	48.35	0.191 9287	9.855 8999	9.860 5834
6	83 40 8.6	29 55.89	50.4	1 3 21.5	47.63	0.192 6188	9.865 2723	9.869 9644
8	84 39 54.7	29 50.26	51.0	1 4 56.0	46.90	0.193 3036	9.874 6579	9.879 3511
10	85 39 29.7	29 44.70	+51.6	+1 6 29.1	+46.17	0.193 9830	9.884 0420	9.888 7287
12	86 38 53.6	29 39.19	52.1	1 8 0.7	45.42	0.194 6569	9.893 4098	9.898 0838
14	87 38 6.5	29 33.75	52.5	1 9 30.8	44.66	0.195 3251	9.902 7491	9.907 4042
16	88 37 8.6	29 28.39	52.9	1 10 59.4	43.91	0.195 9873	9.912 0473	9.916 6772
18	89 36 0.1	29 23.09	53.2	1 12 26.4	43.15	0.196 6434	9.921 2927	9.925 8925
20	90 34 41.0	29 17.85	+53.4	+1 13 51.9	+42.38	0.197 2933	9.930 4754	9.935 0402
22	91 33 11.5	29 12.67	53.6	1 15 15.9	41.61	0.197 9369	9.939 5858	9.944 1113
24	92 31 31.7	29 7.57	53.7	1 16 38.4	40.83	0.198 5740	9.948 6158	9.953 0981
26	93 29 41.8	29 2.54	53.8	1 17 59.3	40.05	0.199 2044	9.957 5575	9.961 9936
28	94 27 41.9	28 57.58	53.8	1 19 18.6	39.27	0.199 8280	9.966 4054	9.970 7924
30	95 25 32.2	28 52.68	+53.7	+1 20 36.3	+38.48	0.200 4448	9.975 1542	9.979 4903
Feb. 1	96 23 12.7	28 47.85	53.6	1 21 52.5	37.69	0.201 0545	9.983 8004	9.988 0840
3	97 20 43.6	28 43.09	53.4	1 23 7.1	36.89	0.201 6570	9.992 3411	9.996 5718
5	98 18 5.1	28 38.40	53.1	1 24 20.0	36.09	0.202 2522	0.000 7759	0.004 9532
7	99 15 17.2	28 33.78	52.8	1 25 31.4	35.29	0.202 8401	0.009 1038	0.013 2275
9	100 12 20.2	28 29.24	+52.5	+1 26 41.2	+34.49	0.203 4205	0.017 3241	0.021 3934
11	101 9 14.2	28 24.77	52.1	1 27 49.4	33.68	0.203 9932	0.025 4353	0.029 4500
13	102 5 59.3	28 20.37	51.6	1 28 55.9	32.87	0.204 5582	0.033 4371	0.037 3963
15	103 2 35.7	28 16.04	51.1	1 30 0.8	32.06	0.205 1153	0.041 3277	0.045 2311
17	103 59 3.5	28 11.77	50.5	1 31 4.1	31.25	0.205 6644	0.049 1065	0.052 9536
19	104 55 22.8	28 7.58	+49.8	+1 32 5.8	+30.43	0.206 2055	0.056 7724	0.060 5629
21	105 51 33.8	28 3.48	49.1	1 33 5.9	29.61	0.206 7385	0.064 3249	0.068 0582
23	106 47 36.8	27 59.45	48.4	1 34 4.3	28.80	0.207 2632	0.071 7628	0.075 4388
25	107 43 31.7	27 55.48	47.6	1 35 1.1	27.99	0.207 7796	0.079 0861	0.082 7048
27	108 39 18.7	27 51.58	46.8	1 35 56.2	27.17	0.208 2876	0.086 2950	0.089 8569
29	109 34 58.0	27 47.76	+45.9	+1 36 49.7	+26.34	0.208 7871	0.093 3906	0.096 8961
Mar. 2	110 30 29.8	27 44.02	45.0	1 37 41.6	25.52	0.209 2779	0.100 3737	0.103 8237
4	111 25 54.1	27 40.36	44.0	1 38 31.8	24.70	0.209 7601	0.107 2465	0.110 6423
6	112 21 11.2	27 36.76	43.0	1 39 20.4	23.89	0.210 2335	0.114 0113	0.117 3536
8	113 16 21 2	27 33.24	41.9	1 40 7.3	23.07	0.210 6981	0.120 6694	0.123 9590
10	114 11 24.2	27 29.80	+40.8	+1 40 52.6	+22.24	0.211 1538	0.127 2225	0.130 4600
12	115 6 20.4	27 26.43	39.7	1 41 36.3	21.42	0.211 6005	0.133 6716	0.136 8574
14	116 1 10.0	27 23.13	38.5	1 42 18.3	20.60	0.212 0382	0.140 0176	0.143 1521
16	116 55 53.0	27 19.89	37.3	1 42 58.7	19.78	0.212 4667	0.146 2611	0.149 3448
18	117 50 29.6	27 16.74	36.0	1 43 37.5	18.97	0.212 8861	0.152 4031	0.155 4360
20	118 45 0.0	27 13.69	+34.7	+1 44 14.6	+18.15	0.213 2963	0.158 4437	0.161 4261
22	119 39 24.4	27 10.72	33.4	1 44 50.1	17.33	0.213 6971	0.164 3834	0.167 3157
24	120 33 42.9	27 7.79	32.1	1 45 23.9	16.51	0.214 0886	0.170 2229	0.173 1052
26	121 27 55.6	27 4.91	30.7	1 45 56.1	15.70	0.214 4707	0.175 9630	0.178 7964
28	122 22 2.6	27 2.15	29.3	1 46 26.7	14.88	0.214 8433	0.181 6055	0.184 3903
30	123 16 4.2	26 59.46	+27.9	+1 46 55.7	+14.07	0.215 2063	0.187 1513	0.189 8888
Apr. 1	124 10 0.5	26 56.84	+26.4	+1 47 23.0	+13.25	0.215 5598	0.192 6030	0.195 2942

MARS.

GREENWICH MEAN NOON.

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							At Date.	At Intermediate Date.
	° ′ ″	′ ″	″	° ′ ″	″			
pr. 1	124 10 0.5	26 56.84	+26.4	+1 47 23.0	+13.25	0.215 5598	0.192 6030	0.195 2942
3	125 3 51.6	26 54.29	24.9	1 47 48.7	12.44	0.215 9037	0.197 9625	0.200 6083
5	125 57 37.7	26 51.82	23.4	1 48 12.8	11.63	0.216 2379	0.203 2317	0.205 8330
7	126 51 18.9	26 49.43	21.9	1 48 35.2	10.82	0.216 5624	0.208 4122	0.210 9695
9	127 44 55.4	26 47.10	20.4	1 48 56.0	10.02	0.216 8771	0.213 5051	0.216 0191
11	128 38 27.3	26 44.85	+18.8	+1 49 15.2	+ 9.21	0.217 1821	0.218 5116	0.220 9828
13	129 31 54.8	26 42.69	17.2	1 49 32.8	8.40	0.217 4772	0.223 4328	0.225 8616
15	130 25 18.1	26 40.60	15.6	1 49 48.8	7.60	0.217 7624	0.228 2693	0.230 6559
17	131 18 37.3	26 38.57	14.0	1 50 3.3	6.80	0.218 0377	0.233 0214	0.235 3658
19	132 11 52.4	26 36.61	12.4	1 50 16.1	6.00	0.218 3031	0.237 6894	0.239 9923
21	133 5 3.7	26 34.74	+10.8	+1 50 27.2	+ 5.20	0.218 5585	0.242 2745	0.244 5359
23	133 58 11.4	26 32.95	9.2	1 50 36.8	4.40	0.218 8039	0.246 7769	0.248 9975
25	134 51 15.6	26 31.23	7.5	1 50 44.8	3.60	0.219 0392	0.251 1980	0.253 3784
27	135 44 16.3	26 29.59	5.9	1 50 51.2	2.83	0.219 2644	0.255 5389	0.257 6798
29	136 37 13.9	26 28.01	4.2	1 50 56.1	2.05	0.219 4795	0.259 8014	0.261 9039
May 1	137 30 8.4	26 26.51	+ 2.6	+1 50 59.4	+ 1.25	0.219 6845	0.263 9873	0.266 0519
3	138 23 0.0	26 25.09	+ 0.9	1 51 1.0	+ 0.45	0.219 8794	0.268 0978	0.270 1252
5	139 15 48.8	26 23.74	− 0.7	1 51 1.2	− 0.34	0.220 0641	0.272 1344	0.274 1255
7	140 8 35.0	26 22.47	2.4	1 50 59.7	1.12	0.220 2386	0.276 0985	0.278 0535
9	141 1 18.7	26 21.27	4.0	1 50 56.7	1.90	0.220 4029	0.279 9907	0.281 9102
11	141 54 0.1	26 20.15	− 5.7	+1 50 52.1	− 2.68	0.220 5569	0.283 8121	0.285 6963
13	142 46 39.3	26 19.10	7.3	1 50 45.9	3.46	0.220 7007	0.287 5630	0.289 4122
15	143 39 16.5	26 18.12	8.9	1 50 38.2	4.23	0.220 8342	0.291 2440	0.293 0583
17	144 31 51.8	26 17.22	10.5	1 50 29.0	5.01	0.220 9574	0.294 8552	0.296 6348
19	145 24 25.4	26 16.40	12.1	1 50 18.2	5.78	0.221 0703	0.298 3970	0.300 1418
21	146 16 57.4	26 15.65	−13.7	+1 50 5.9	− 6.55	0.221 1729	0.301 8694	0.303 5800
23	147 9 28.0	26 14.97	15.3	1 49 52.0	7.32	0.221 2651	0.305 2737	0.306 9507
25	148 1 57.3	26 14.37	16.9	1 49 36.6	8.08	0.221 3470	0.308 6111	0.310 2547
27	148 54 25.5	26 13.84	18.4	1 49 19.7	8.84	0.221 4186	0.311 8819	0.313 4932
29	149 46 52.7	26 13.39	20.0	1 49 1.3	9.59	0.221 4798	0.315 0885	0.316 6679
31	150 39 19.1	26 13.01	−21.5	+1 48 41.3	−10.35	0.221 5306	0.318 2317	0.319 7799
ne 2	151 31 44.8	26 12.68	23.0	1 48 19.8	11.11	0.221 5710	0.321 3127	0.322 8301
4	152 24 9.9	26 12.44	24.5	1 47 56.8	11.86	0.221 6011	0.324 3323	0.325 8194
6	153 16 34.6	26 12.31	25.9	1 47 32.4	12.61	0.221 6208	0.327 2914	0.328 7483
8	154 8 59.2	26 12.25	27.3	1 47 6.4	13.36	0.221 6301	0.330 1903	0.331 6176
10	155 1 23.7	26 12.24	−28.7	+1 46 38.9	−14.11	0.221 6291	0.333 0300	0.334 4275
12	155 53 48.2	26 12.30	30.1	1 46 9.9	14.85	0.221 6177	0.335 8103	0.337 1782
14	156 46 12.9	26 12.44	31.4	1 45 39.5	15.58	0.221 5959	0.338 5313	0.339 8697
16	157 38 38.0	26 12.66	32.7	1 45 7.6	16.32	0.221 5637	0.341 1933	0.342 5023
18	158 31 3.6	26 12.96	34.0	1 44 34.2	17.06	0.221 5211	0.343 7965	0.345 0761
20	159 23 29.9	26 13.32	−35.3	+1 43 59.4	−17.79	0.221 4681	0.346 3412	0.347 5918
22	160 15 56.9	26 13.76	36.5	1 43 23.1	18.52	0.221 4048	0.348 8281	0.350 0502
24	161 8 24.9	26 14.28	37.7	1 42 45.3	19.24	0.221 3312	0.351 2582	0.352 4523
26	162 0 54.0	26 14.87	38.9	1 42 6.1	19.97	0.221 2472	0.353 6326	0.354 7993
28	162 53 24.4	26 15.54	40.0	1 41 25.4	20.69	0.221 1528	0.355 9524	0.357 0921
30	163 45 56.2	26 16.29	−41.1	+1 40 43.3	−21.40	0.221 0481	0.358 2184	0.359 3315
y 2	164 38 29.6	26 17.10	−42.1	+1 39 59.8	−22.12	0.220 9331	0.360 4315	0.361 5184

MARS.

GREENWICH MEAN NOON.

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								At Date.	At Inte diate
		° ′ ″	′ ″	″	° ′ ″	″			
July	2	164 38 29.6	26 17.10	−42.1	+1 39 59.8	−22.12	0.220 9331	0.360 4315	0.361
	4	165 31 4.7	26 17.98	43.1	1 39 14.8	22.83	0.220 8078	0.362 5922	0.363
	6	166 23 41.6	26 18.95	44.1	1 38 28.5	23.54	0.220 6722	0.364 7009	0.365
	8	167 16 20.5	26 19.99	45.0	1 37 40.7	24.25	0.220 5263	0.366 7581	0.367
	10	168 9 1.6	26 21.11	45.9	1 36 51.5	24.95	0.220 3701	0.368 7638	0.369
	12	169 1 44.9	26 22.30	−46.7	+1 36 0.9	−25.65	0.220 2037	0.370 7181	0.371
	14	169 54 30.7	26 23.56	47.5	1 35 8.9	26.34	0.220 0271	0.372 6209	0.373
	16	170 47 19.2	26 24.90	48.3	1 34 15.5	27.03	0.219 8403	0.374 4720	0.375
	18	171 40 10.4	26 26.32	49.0	1 33 20.7	27.73	0.219 6433	0.376 2722	0.377
	20	172 33 4.5	26 27.80	49.6	1 32 24.6	28.41	0.219 4362	0.378 0212	0.378
	22	173 26 1.6	26 29.37	−50.2	+1 31 27.1	−29.09	0.219 2190	0.379 7202	0.380
	24	174 19 2.0	26 31.01	50.8	1 30 28.2	29.77	0.218 9916	0.381 3699	0.382
	26	175 12 5.7	26 32.73	51.3	1 29 28.0	30.45	0.218 7541	0.382 9711	0.383
	28	176 5 12.9	26 34.53	51.8	1 28 26.4	31.12	0.218 5066	0.384 5249	0.385
	30	176 58 23.8	26 36.39	52.2	1 27 23.5	31.79	0.218 2491	0.386 0316	0.386
Aug.	1	177 51 38.5	26 38.32	−52.6	+1 26 19.2	−32.45	0.217 9816	0.387 4915	0.388
	3	178 44 57.2	26 40.34	52.9	1 25 13.6	33.11	0.217 7042	0.388 9053	0.389
	5	179 38 19.9	26 42.44	53.2	1 24 6.8	33.77	0.217 4168	0.390 2735	0.390
	7	180 31 46.9	26 44.61	53.4	1 22 58.6	34.43	0.217 1196	0.391 5958	0.392
	9	181 25 18.4	26 46.86	53.6	1 21 49.1	35.08	0.216 8125	0.392 8724	0.393
	11	182 18 54.4	26 49.18	−53.7	+1 20 38.3	−35.72	0.216 4956	0.394 1030	0.394
	13	183 12 35.1	26 51.57	53.8	1 19 26.2	36.36	0.216 1690	0.395 2873	0.395
	15	184 6 20.7	26 54.04	53.8	1 18 12.8	36.99	0.215 8327	0.396 4254	0.396
	17	185 0 11.3	26 56.59	53.8	1 16 58.2	37.62	0.215 4867	0.397 5177	0.398
	19	185 54 7.1	26 59.21	53.7	1 15 42.3	38.25	0.215 1311	0.398 5646	0.399
	21	186 48 8.2	27 1.91	−53.5	+1 14 25.2	−38.87	0.214 7659	0.399 5670	0.400
	23	187 42 14.8	27 4.69	53.3	1 13 6.9	39.48	0.214 3912	0.400 5255	0.400
	25	188 36 27.0	27 7.54	53.1	1 11 47.3	40.09	0.214 0070	0.401 4407	0.401
	27	189 30 45.0	27 10.46	52.8	1 10 26.5	40.69	0.213 6134	0.402 3131	0.402
	29	190 25 8.9	27 13.46	52.4	1 9 4.5	41.29	0.213 2105	0.403 1433	0.403
	31	191 19 38.9	27 16.54	−52.0	+1 7 41.4	−41.89	0.212 7982	0.403 9317	0.404
Sept.	2	192 14 15.1	27 19.70	51.5	1 6 17.0	42.48	0.212 3767	0.404 6783	0.405
	4	193 8 57.7	27 22.93	51.0	1 4 51.4	43.07	0.211 9460	0.405 3834	0.405
	6	194 3 46.8	27 26.24	50.4	1 3 24.7	43.64	0.211 5063	0.406 0470	0.406
	8	194 58 42.6	27 29.62	49.8	1 1 56.9	44.21	0.211 0575	0.406 6687	0.406
	10	195 53 45.3	27 33.07	−49.1	+1 0 27.9	−44.78	0.210 5997	0.407 2484	0.407
	12	196 48 54.9	27 36.60	48.4	0 58 57.7	45.33	0.210 1330	0.407 7856	0.408
	14	197 44 11.7	27 40.21	47.6	0 57 26.5	45.88	0.209 6575	0.408 2807	0.408
	16	198 39 35.8	27 43.90	46.8	0 55 54.2	46.43	0.209 1732	0.408 7343	0.408
	18	199 35 7.3	27 47.66	45.9	0 54 20.8	46.97	0.208 6803	0.409 1467	0.409
	20	200 30 46.4	27 51.49	−45.0	+0 52 46.3	−47.50	0.208 1788	0.409 5187	0.409
	22	201 26 33.3	27 55.39	44.0	0 51 10.8	48.02	0.207 6688	0.409 8509	0.410
	24	202 22 28.1	27 59.37	43.0	0 49 34.3	48.53	0.207 1504	0.410 1439	0.410
	26	203 18 30.8	28 3.43	41.9	0 47 56.7	49.04	0.206 6236	0.410 3980	0.410
	28	204 14 41.7	28 7.56	40.8	0 46 18.1	49.54	0.206 0886	0.410 6136	0.410
	30	205 11 1.0	28 11.76	−39.6	+0 44 38.5	−50.03	0.205 5455	0.410 7911	0.410
Oct.	*2*	*206 7 28.8*	*28 16.04*	−38.4	+0 42 58.0	−50.51	0.204 9943	0.410 9305	0.410

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GREENWICH MEAN NOON.

Date.	Heliocentric Longitude, Mean Equinox of Date.	Daily Motion.	Reduction to Orbit.	Heliocentric Latitude.	Daily Motion.	Logarithm of Radius Vector.	Logarithm of Distance from Earth— At Date.	Logarithm of Distance from Earth— At Intermediate Date.
	° ′ ″	′ ″	″	° ′ ″	″			
ct. 2	206 7 28.8	28 16.04	−38.4	+0 42 58.0	−50.51	0.204 9943	0.410 9305	0.410 9859
4	207 4 5.2	28 20.40	37.1	0 41 16.5	50.98	0.204 4352	0.411 0318	0.411 0681
6	208 0 50.4	28 24.82	35.8	0 39 34.1	51.45	0.203 8682	0.411 0948	0.411 1118
8	208 57 44.5	28 29.32	34.5	0 37 50.7	51.91	0.203 2936	0.411 1192	0.411 1169
10	209 54 47.7	28 33.89	33.1	0 36 6.4	52.35	0.202 7114	0.411 1049	0.411 0832
12	210 52 0.1	28 38.53	−31.7	+0 34 21.3	−52.78	0.202 1216	0.411 0519	0.411 0110
14	211 49 21.9	28 43.25	30.2	0 32 35.3	53.21	0.201 5244	0.410 9605	0.410 9006
16	212 46 53.1	28 48.04	28.7	0 30 48.4	53.63	0.200 9200	0.410 8313	0.410 7527
18	213 44 34.0	28 52.90	27.1	0 29 0.7	54.03	0.200 3084	0.410 6648	0.410 5677
20	214 42 24.7	28 57.83	25.5	0 27 12.3	54.42	0.199 6898	0.410 4615	0.410 3464
22	215 40 25.4	29 2.83	−23.9	+0 25 23.1	−54.80	0.199 0643	0.410 2223	0.410 0894
24	216 38 36.1	29 7.90	22.3	0 23 33.1	55.17	0.198 4321	0.409 9476	0.409 7971
26	217 36 57.0	29 13.04	20.6	0 21 42.4	55.53	0.197 7933	0.409 6379	0.409 4701
28	218 35 28.3	29 18.24	18.9	0 19 51.0	55.88	0.197 1480	0.409 2937	0.409 1086
30	219 34 10.0	29 23.51	17.2	0 17 58.9	56.21	0.196 4963	0.408 9148	0.408 7125
Nov. 1	220 33 2.3	29 28.85	−15.4	+0 16 6.1	−56.53	0.195 8384	0.408 5016	0.408 2820
3	221 32 5.4	29 34.26	13.7	0 14 12.7	56.84	0.195 1745	0.408 0537	0.407 8167
5	222 31 19.4	29 39.73	11.9	0 12 18.7	57.13	0.194 5048	0.407 5709	0.407 3165
7	223 30 44.4	29 45.27	10.0	0 10 24.2	57.41	0.193 8293	0.407 0533	0.406 7814
9	224 30 20.5	29 50.88	8.2	0 8 29.1	57.68	0.193 1483	0.406 5008	0.406 2116
11	225 30 7.9	29 56.55	− 6.3	+0 6 33.5	−57.93	0.192 4619	0.405 9137	0.405 6073
13	226 30 6.7	30 2.28	4.5	0 4 37.4	58.16	0.191 7703	0.405 2925	0.404 9694
15	227 30 17.0	30 8.06	2.6	0 2 40.8	58.39	0.191 0736	0.404 6380	0.404 2982
17	228 30 39.0	30 13.91	− 0.7	+0 0 43.8	58.59	0.190 3721	0.403 9503	0.403 5944
19	229 31 12.7	30 19.82	+ 1.2	−0 1 13.5	58.78	0.189 6659	0.403 2305	0.402 8587
21	230 31 58.3	30 25.79	+ 3.1	−0 3 11.2	−58.95	0.188 9553	0.402 4791	0.402 0918
23	231 32 55.9	30 31.81	5.0	0 5 9.3	59.11	0.188 2403	0.401 6968	0.401 2942
25	232 34 5.6	30 37.88	6.9	0 7 7.7	59.26	0.187 5212	0.400 8841	0.400 4666
27	233 35 27.5	30 44.02	8.8	0 9 6.3	59.37	0.186 7982	0.400 0416	0.399 6091
29	234 37 1.7	30 50.23	10.7	0 11 5.2	59.47	0.186 0716	0.399 1692	0.398 7218
ec. 1	235 38 48.4	30 56.49	+12.6	−0 13 4.2	−59.55	0.185 3414	0.398 2669	0.397 8044
3	236 40 47.6	31 2.77	14.5	0 15 3.4	59.61	0.184 6080	0.397 3344	0.396 8568
5	237 42 59.4	31 9.09	16.4	0 17 2.7	59.65	0.183 8715	0.396 3718	0.395 8793
7	238 45 23.9	31 15.47	18.2	0 19 2.0	59.67	0.183 1323	0.395 3794	0.394 8720
9	239 48 1.3	31 21.91	20.0	0 21 1.3	59.68	0.182 3904	0.394 3572	0.393 8352
11	240 50 51.6	31 28.38	+21.8	−0 23 0.7	−59.67	0.181 6461	0.393 3059	0.392 7694
13	241 53 54.8	31 34.89	23.6	0 25 0.0	59.64	0.180 8998	0.392 2258	0.391 6752
15	242 57 11.1	31 41.45	25.4	0 26 59.2	59.58	0.180 1516	0.391 1178	0.390 5536
17	244 0 40.6	31 48.05	27.1	0 28 58.3	59.49	0.179 4017	0.389 9827	0.389 4052
19	245 4 23.4	31 54.68	28.8	0 30 57.2	59.39	0.178 6504	0.388 8213	0.388 2310
21	246 8 19.4	32 1.35	+30.5	−0 32 55.9	−59.26	0.177 8980	0.387 6344	0.387 0317
23	247 12 28.8	32 8.05	32.1	0 34 54.3	59.11	0.177 1447	0.386 4228	0.385 8078
25	248 16 51.6	32 14.78	33.7	0 36 52.3	58.94	0.176 3908	0.385 1868	0.384 5599
27	249 21 27.9	32 21.53	35.3	0 38 50.0	58.74	0.175 6366	0.383 9270	0.383 2881
29	250 26 17.8	32 28.31	36.8	0 40 47.3	58.52	0.174 8823	0.382 6433	0.381 9925
31	251 31 21.2	32 35.11	+38.2	−0 42 44.1	−58.28	0.174 1282	0.381 3358	0.380 6732
33	252 36 38.2	32 41.94	+39.6	−0 44 40.4	−58.01	0.173 3745	0.380 0046	0.379 3300

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GREENWICH MEAN NOON.

Date.	Heliocentric Longitude, Mean Equinox of Date.	Daily Motion.	Reduction to Orbit.	Heliocentric Latitude.	Daily Motion.	Logarithm of Radius Vector.	Logarithm of Distance from Earth— At Date.	Logarithm of Distance from Earth— At Intermediate Date.
	° ′ ″	′ ″	″	° ′ ″	″			
Jan. 0	238 31 24.2	4 40.44	−26.6	+0 51 32.7	−4.84	0.730 0995	0.789 2507	0.787 9005
4	238 50 6.1	4 40.55	26.6	0 51 13.3	4.86	0.730 0152	0.786 4946	0.785 0332
8	239 8 48.5	4 40.66	26.5	0 50 53.8	4.88	0.729 9304	0.783 5168	0.781 9457
12	239 27 31.4	4 40.77	26.5	0 50 34.2	4.91	0.729 8451	0.780 3201	0.778 6405
16	239 46 14.7	4 40.88	26.4	0 50 14.5	4.93	0.729 7594	0.776 9075	0.775 1218
20	240 4 58.4	4 40.99	−26.4	+0 49 54.8	−4.96	0.729 6733	0.773 2843	0.771 3957
24	240 23 42.6	4 41.10	26.3	0 49 35.0	4.98	0.729 5867	0.769 4571	0.767 4695
28	240 42 27.3	4 41.22	26.2	0 49 15.0	5.01	0.729 4996	0.765 4341	0.763 3520
Feb. 1	241 1 12.4	4 41.33	26.2	0 48 54.9	5.03	0.729 4121	0.761 2243	0.759 0519
5	241 19 57.9	4 41.44	26.1	0 48 34.7	5.06	0.729 3242	0.756 8358	0.754 5770
9	241 38 43.8	4 41.55	−26.1	+0 48 14.4	−5.08	0.729 2358	0.752 2765	0.749 9356
13	241 57 30.3	4 41.66	26.0	0 47 54.1	5.10	0.729 1470	0.747 5557	0.745 1383
17	242 16 17.2	4 41.78	25.9	0 47 33.7	5.12	0.729 0577	0.742 6851	0.740 1979
21	242 35 4.5	4 41.89	25.8	0 47 13.2	5.15	0.728 9680	0.737 6786	0.735 1294
25	242 53 52.3	4 42.01	25.8	0 46 52.5	5.17	0.728 8779	0.732 5523	0.729 9495
29	243 12 40.6	4 42.13	−25.7	+0 46 31.8	−5.20	0.728 7873	0.727 3231	0.724 6752
Mar. 4	243 31 29.4	4 42.25	25.6	0 46 11.0	5.22	0.728 6963	0.722 0078	0.719 3231
8	243 50 18.6	4 42.36	25.5	0 45 50.1	5.24	0.728 6048	0.716 6233	0.713 9108
12	244 9 8.3	4 42.48	25.4	0 45 29.1	5.26	0.728 5129	0.711 1885	0.708 4592
16	244 27 58.5	4 42.60	25.3	0 45 8.0	5.28	0.728 4207	0.705 7258	0.702 9915
20	244 46 49.2	4 42.72	−25.2	+0 44 46.8	−5.30	0.728 3280	0.700 2597	0.697 5339
24	245 5 40.3	4 42.84	25.1	0 44 25.6	5.33	0.728 2349	0.694 8177	0.692 1144
28	245 24 31.9	4 42.96	25.0	0 44 4.3	5.35	0.728 1414	0.689 4276	0.686 7608
Apr. 1	245 43 24.0	4 43.08	24.9	0 43 42.8	5.37	0.728 0474	0.684 1173	0.681 5008
5	246 2 16.6	4 43.21	24.8	0 43 21.2	5.39	0.727 9530	0.678 9147	0.676 3629
9	246 21 9.7	4 43.34	−24.6	+0 42 59.6	−5.42	0.727 8582	0.673 8493	0.671 3783
13	246 40 3.2	4 43.46	24.5	0 42 37.9	5.44	0.727 7630	0.668 9540	0.666 5806
17	246 58 57.3	4 43.58	24.4	0 42 16.1	5.46	0.727 6675	0.664 2626	0.662 0044
21	247 17 51.9	4 43.70	24.3	0 41 54.2	5.48	0.727 5715	0.659 8102	0.657 6844
25	247 36 46.9	4 43.83	24.2	0 41 32.3	5.50	0.727 4751	0.655 6309	0.653 6536
29	247 55 42.5	4 43.96	−24.0	+0 41 10.3	−5.52	0.727 3783	0.651 7560	0.649 9417
May 3	248 14 38.6	4 44.08	23.9	0 40 48.1	5.55	0.727 2812	0.648 2144	0.646 5775
7	248 33 35.2	4 44.21	23.8	0 40 25.8	5.57	0.727 1836	0.645 0345	0.643 5891
11	248 52 32.2	4 44.33	23.6	0 40 3.5	5.59	0.727 0856	0.642 2446	0.641 0041
15	249 11 29.8	4 44.46	23.5	0 39 41.1	5.61	0.726 9873	0.639 8708	0.638 8476
19	249 30 27.9	4 44.59	−23.3	+0 39 18.7	−5.63	0.726 8886	0.637 9367	0.637 1403
23	249 49 26.5	4 44.72	23.2	0 38 56.1	5.65	0.726 7895	0.636 4599	0.635 8968
27	250 8 25.7	4 44.85	23.0	0 38 33.5	5.67	0.726 6900	0.635 4518	0.635 1255
31	250 27 25.4	4 44.98	22.9	0 38 10.8	5.69	0.726 5902	0.634 9184	0.634 8308
June 4	250 46 25.5	4 45.11	22.7	0 37 48.0	5.71	0.726 4899	0.634 8629	0.635 0144
8	251 5 26.2	4 45.24	−22.6	+0 37 25.1	−5.73	0.726 3893	0.635 2851	0.635 6742
12	251 24 27.4	4 45.37	22.4	0 37 2.2	5.75	0.726 2883	0.636 1808	0.636 8036
16	251 43 29.2	4 45.50	22.2	0 36 39.2	5.77	0.726 1870	0.637 5410	0.638 3909
20	252 2 31.5	4 45.63	22.0	0 36 16.1	5.79	0.726 0853	0.639 3506	0.640 4172
24	252 21 34.3	4 45.77	21.9	0 35 52.9	5.81	0.725 9832	0.641 5878	0.642 8592
28	252 40 37.7	4 45.90	−21.7	+0 35 29.6	−5.83	0.725 8808	0.644 2281	0.645 6915
July 2	252 59 41.6	4 46.04	−21.5	+0 35 6.2	−5.85	0.725 7780	0.647 2459	0.648 8880

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							At Date.	At Intermediate Date.
	° ′ ″	′ ″	″	° ′ ″	″			
July 2	252 59 41.6	4 46.04	−21.5	+0 35 6.2	−5.85	0.725 7780	0.647 2459	0.648 8880
6	253 18 46.0	4 46.17	21.3	0 34 42.8	5.87	0.725 6749	0.650 6143	0.652 4211
10	253 37 51.0	4 46.31	21.2	0 34 19.3	5.89	0.725 5714	0.654 3049	0.656 2621
14	253 56 56.5	4 46.45	21.0	0 33 55.8	5.90	0.725 4676	0.658 2885	0.660 3797
18	254 16 2.5	4 46.58	20.8	0 33 32.2	5.92	0.725 3635	0.662 5317	0.664 7401
22	254 35 9.1	4 46.72	−20.6	+0 33 8.4	−5.94	0.725 2590	0.667 0004	0.669 3086
26	254 54 16.3	4 46.86	20.4	0 32 44.6	5.96	0.725 1542	0.671 6607	0.674 0528
30	255 13 24.0	4 47.00	20.2	0 32 20.8	5.97	0.725 0490	0.676 4811	0.678 9422
Aug. 3	255 32 32.3	4 47.14	20.0	0 31 56.9	5.99	0.724 9435	0.681 4327	0.683 9489
7	255 51 41.1	4 47.28	19.8	0 31 32.8	6.01	0.724 8376	0.686 4873	0.689 0447
11	256 10 50.5	4 47.42	−19.6	+0 31 8.7	−6.03	0.724 7314	0.691 6177	0.694 2028
15	256 30 0.4	4 47.56	19.4	0 30 44.6	6.04	0.724 6250	0.696 7963	0.699 3949
19	256 49 10.9	4 47.70	19.2	0 30 20.4	6.06	0.724 5182	0.701 9952	0.704 5943
23	257 8 22.0	4 47.84	19.0	0 29 56.1	6.08	0.724 4111	0.707 1895	0.709 7781
27	257 27 33.7	4 47.98	18.8	0 29 31.8	6.10	0.724 3037	0.712 3577	0.714 9259
31	257 46 45.9	4 48.12	−18.6	+0 29 7.4	−6.11	0.724 1959	0.717 4806	0.720 0196
Sept. 4	258 5 58.7	4 48.26	18.3	0 28 42.9	6.13	0.724 0878	0.722 5406	0.725 0416
8	258 25 12.0	4 48.40	18.1	0 28 18.3	6.15	0.723 9795	0.727 5206	0.729 9754
12	258 44 25.9	4 48.55	17.9	0 27 53.7	6.16	0.723 8709	0.732 4038	0.734 8037
16	259 3 40.4	4 48.69	17.7	0 27 29.0	6.18	0.723 7619	0.737 1731	0.739 5103
20	259 22 55.5	4 48.84	−17.4	+0 27 4.3	−6.19	0.723 6527	0.741 8140	0.744 0827
24	259 42 11.2	4 48.98	17.2	0 26 39.5	6.21	0.723 5432	0.746 3150	0.748 5097
28	260 1 27.4	4 49.13	17.0	0 26 14.6	6.22	0.723 4334	0.750 6658	0.752 7822
Oct. 2	260 20 44.2	4 49.28	16.7	0 25 49.7	6.24	0.723 3232	0.754 8578	0.756 8915
6	260 40 1.6	4 49.42	16.5	0 25 24.7	6.26	0.723 2128	0.758 8819	0.760 8280
10	260 59 19.6	4 49.57	−16.3	+0 24 59.6	−6.27	0.723 1021	0.762 7285	0.764 5824
14	261 18 38.2	4 49.72	16.0	0 24 34.5	6.28	0.722 9911	0.766 3885	0.768 1459
18	261 37 57.3	4 49.86	15.8	0 24 9.4	6.30	0.722 8799	0.769 8539	0.771 5117
22	261 57 17.0	4 50.01	15.5	0 23 44.1	6.32	0.722 7684	0.773 1188	0.774 6749
26	262 16 37.4	4 50.16	15.3	0 23 18.8	6.33	0.722 6566	0.776 1793	0.777 6315
30	262 35 58.4	4 50.31	−15.0	+0 22 53.5	−6.34	0.722 5446	0.779 0311	0.780 3776
Nov. 3	262 55 19.9	4 50.46	14.8	0 22 28.1	6.36	0.722 4323	0.781 6701	0.782 9080
7	263 14 42.0	4 50.61	14.5	0 22 2.6	6.37	0.722 3197	0.784 0908	0.785 2177
11	263 34 4.8	4 50.76	14.3	0 21 37.1	6.38	0.722 2069	0.786 2881	0.787 3016
15	263 53 28.2	4 50.91	14.0	0 21 11.6	6.40	0.722 0938	0.788 2579	0.789 1566
19	264 12 52.1	4 51.06	−13.7	+0 20 46.0	−6.41	0.721 9805	0.789 9977	0.790 7811
23	264 32 16.6	4 51.21	13.5	0 20 20.3	6.42	0.721 8669	0.791 5065	0.792 1738
27	264 51 41.8	4 51.36	13.2	0 19 54.6	6.44	0.721 7531	0.792 7828	0.793 3333
Dec. 1	265 11 7.6	4 51.52	13.0	0 19 28.8	6.45	0.721 6391	0.793 8251	0.794 2576
5	265 30 33.9	4 51.67	12.7	0 19 3.0	6.46	0.721 5248	0.794 6305	0.794 9434
9	265 50 0.9	4 51.82	−12.4	+0 18 37.1	−6.48	0.721 4103	0.795 1960	0.795 3882
13	266 9 28.5	4 51.97	12.1	0 18 11.1	6.49	0.721 2955	0.795 5200	0.795 5915
17	266 28 56.7	4 52.13	11.9	0 17 45.1	6.50	0.721 1805	0.795 6027	0.795 5535
21	266 48 25.6	4 52.28	11.6	0 17 19.1	6.51	0.721 0654	0.795 4442	0.795 2749
25	267 7 55.1	4 52.44	11.3	0 16 53.1	6.52	0.720 9500	0.795 0456	0.794 7564
29	267 27 25.1	4 52.59	−11.0	+0 16 27.0	−6.54	0.720 8344	0.794 4072	0.793 9978
33	267 46 55.8	4 52.75	−10.8	+0 16 0.8	−6.55	0.720 7186	0.793 5280	0.792 9977

SATURN.

GREENWICH MEAN NOON.

Date.	Heliocentric Longitude, Mean Equinox of Date.	Daily Motion.	Reduction to Orbit.	Heliocentric Latitude.	Daily Motion.	Logarithm of Radius Vector.	Logarithm of Distance from Earth— At Date.	Logarithm of Distance from Earth— At Intermediate Date.
	° ′ ″	′ ″	′ ″	° ′ ″	″			
Jan. 0	48 35 45.6	2 11.06	−1 16.2	−2 14 45.8	+2.46	0.960 9583	0.931 6486	0.933 0498
4	48 44 29.9	2 11.08	1 16.6	2 14 35.9	2.48	0.960 9186	0.934 4793	0.935 9348
8	48 53 14.3	2 11.10	1 16.9	2 14 25.9	2.49	0.960 8789	0.937 4139	0.938 9149
12	49 1 58.8	2 11.13	1 17.2	2 14 15.9	2.50	0.960 8393	0.940 4357	0.941 9740
16	49 10 43.4	2 11.15	1 17.5	2 14 5.9	2.52	0.960 7999	0.943 5274	0.945 0936
20	49 19 28.0	2 11.17	−1 17.8	−2 13 55.8	+2.53	0.960 7606	0.946 6705	0.948 2558
24	49 28 12.8	2 11.20	1 18.1	2 13 45.6	2.55	0.960 7214	0.949 8473	0.951 4427
28	49 36 57.6	2 11.22	1 18.4	2 13 35.4	2.56	0.960 6823	0.953 0399	0.954 6368
Feb. 1	49 45 42.5	2 11.24	1 18.7	2 13 25.1	2.57	0.960 6433	0.956 2317	0.957 8230
5	49 54 27.6	2 11.27	1 18.9	2 13 14.8	2.59	0.960 6045	0.959 4088	0.960 9875
9	50 3 12.7	2 11.29	−1 19.2	−2 13 4.4	+2.60	0.960 5658	0.962 5573	0.964 1167
13	50 11 57.9	2 11.31	1 19.5	2 12 54.0	2.61	0.960 5272	0.965 6640	0.967 1974
17	50 20 43.2	2 11.34	1 19.8	2 12 43.5	2.62	0.960 4887	0.968 7155	0.970 2165
21	50 29 28.6	2 11.36	1 20.1	2 12 33.0	2.64	0.960 4503	0.971 6991	0.973 1616
25	50 38 14.0	2 11.38	1 20.4	2 12 22.4	2.65	0.960 4120	0.974 6027	0.976 0212
29	50 46 59.6	2 11.41	−1 20.7	−2 12 11.8	+2.67	0.960 3738	0.977 4159	0.978 7858
Mar. 4	50 55 45.3	2 11.43	1 21.0	2 12 1.1	2.68	0.960 3357	0.980 1299	0.981 4473
8	51 4 31.1	2 11.45	1 21.3	2 11 50.3	2.69	0.960 2977	0.982 7370	0.983 9981
12	51 13 16.9	2 11.48	1 21.6	2 11 39.5	2.70	0.960 2599	0.985 2296	0.986 4305
16	51 22 2.9	2 11.50	1 21.8	2 11 28.7	2.72	0.960 2221	0.987 5999	0.988 7369
20	51 30 48.9	2 11.52	−1 22.1	−2 11 17.8	+2.73	0.960 1844	0.989 8407	0.990 9105
24	51 39 35.0	2 11.54	1 22.4	2 11 6.8	2.75	0.960 1468	0.991 9456	0.992 9453
28	51 48 21.2	2 11.56	1 22.6	2 10 55.8	2.76	0.960 1094	0.993 9091	0.994 8367
Apr. 1	51 57 7.5	2 11.58	1 22.9	2 10 44.8	2.77	0.960 0721	0.995 7275	0.996 5812
5	52 5 53.9	2 11.61	1 23.1	2 10 33.7	2.78	0.960 0350	0.997 3974	0.998 1757
9	52 14 40.4	2 11.63	−1 23.4	−2 10 22.5	+2.80	0.959 9979	0.998 9157	0.999 6169
13	52 23 27.0	2 11.65	1 23.6	2 10 11.3	2.81	0.959 9609	1.000 2788	1.000 9011
17	52 32 13.6	2 11.68	1 23.9	2 10 0.0	2.82	0.959 9240	1.001 4833	1.002 0251
21	52 41 0.4	2 11.70	1 24.2	2 9 48.7	2.84	0.959 8872	1.002 5263	1.002 9867
25	52 49 47.2	2 11.72	1 24.4	2 9 37.3	2.85	0.959 8506	1.003 4061	1.003 7846
29	52 58 34.1	2 11.74	−1 24.6	−2 9 25.9	+2.87	0.959 8141	1.004 1222	1.004 4189
May 3	53 7 21.1	2 11.76	1 24.9	2 9 14.4	2.88	0.959 7778	1.004 6746	1.004 8892
7	53 16 8.2	2 11.78	1 25.1	2 9 2.8	2.89	0.959 7416	1.005 0624	1.005 1942
11	53 24 55.4	2 11.81	1 25.3	2 8 51.2	2.90	0.959 7054	1.005 2845	1.005 3334
15	53 33 42.7	2 11.83	1 25.6	2 8 39.6	2.91	0.959 6693	1.005 3407	1.005 3063
19	53 42 30.1	2 11.85	−1 25.8	−2 8 28.0	+2.93	0.959 6333	1.005 2303	1.005 1128
23	53 51 17.5	2 11.87	1 26.1	2 8 16.2	2.94	0.959 5975	1.004 9541	1.004 7543
27	54 0 5.0	2 11.89	1 26.3	2 8 4.4	2.96	0.959 5618	1.004 5136	1.004 2324
31	54 8 52.6	2 11.91	1 26.6	2 7 52.5	2.97	0.959 5262	1.003 9109	1.003 5493
June 4	54 17 40.3	2 11.93	1 26.8	2 7 40.6	2.98	0.959 4908	1.003 1476	1.002 7059
8	54 26 28.1	2 11.96	−1 27.1	−2 7 28.7	+2.99	0.959 4554	1.002 2245	1.001 7035
12	54 35 16.0	2 11.98	1 27.3	2 7 16.7	3.01	0.959 4201	1.001 1431	1.000 5435
16	54 44 3.9	2 12.00	1 27.5	2 7 4.6	3.02	0.959 3849	0.999 9050	0.999 2280
20	54 52 51.9	2 12.02	1 27.7	2 6 52.5	3.03	0.959 3498	0.998 5131	0.997 7607
24	55 1 40.1	2 12.04	1 27.9	2 6 40.3	3.04	0.959 3149	0.996 9713	0.996 1456
28	55 10 28.3	2 12.06	−1 28.1	−2 6 28.1	+3.06	0.959 2801	0.995 2839	0.994 3867
July 2	*55 19 16.5*	2 12.08	−1 28.3	−2 6 15.9	+3.07	0.959 2455	0.993 4544	0.992 4874

SATURN.

GREENWICH MEAN NOON.

Date.	Heliocentric Longitude, Mean Equinox of Date.	Daily Motion.	Reduction to Orbit.	Heliocentric Latitude.	Daily Motion.	Logarithm of Radius Vector.	Logarithm of Distance from Earth—	
							At Date.	At Intermediate Date.
	° ′ ″	′ ″	′ ″	° ′ ″	″			
July 2	55 19 16.5	2 12.08	−1 28.3	−2 6 15.9	+3.07	0.959 2455	0.993 4544	0.992 4874
6	55 28 4.8	2 12.10	1 28.5	2 6 3.6	3.09	0.959 2112	0.991 4863	0.990 4515
10	55 36 53.3	2 12.12	1 28.7	2 5 51.2	3.10	0.959 1769	0.989 3833	0.988 2825
14	55 45 41.8	2 12.14	1 28.9	2 5 38.8	3.11	0.959 1426	0.987 1498	0.985 9859
18	55 54 30.4	2 12.16	1 29.1	2 5 26.3	3.12	0.959 1084	0.984 7916	0.983 5680
22	56 3 19.1	2 12.18	−1 29.3	−2 5 13.8	+3.14	0.959 0744	0.982 3160	0.981 0364
26	56 12 7.9	2 12.20	1 29.5	2 5 1.2	3.15	0.959 0404	0.979 7300	0.978 3978
30	56 20 56.7	2 12.22	1 29.7	2 4 48.6	3.16	0.959 0066	0.977 0406	0.975 6593
Aug. 3	56 29 45.7	2 12.24	1 29.9	2 4 35.9	3.18	0.958 9729	0.974 2549	0.972 8283
7	56 38 34.7	2 12.26	1 30.1	2 4 23.2	3.19	0.958 9394	0.971 3805	0.969 9125
11	56 47 23.8	2 12.28	−1 30.3	−2 4 10.4	+3.20	0.958 9059	0.968 4256	0.966 9212
15	56 56 13.0	2 12.30	1 30.5	2 3 57.6	3.21	0.958 8726	0.965 4008	0.963 8657
19	57 5 2.2	2 12.32	1 30.7	2 3 44.7	3.23	0.958 8394	0.962 3173	0.960 7574
23	57 13 51.5	2 12.34	1 30.9	2 3 31.8	3.24	0.958 8063	0.959 1874	0.957 6086
27	57 22 40.9	2 12.36	1 31.0	2 3 18.8	3.25	0.958 7733	0.956 0225	0.954 4307
31	57 31 30.4	2 12.38	−1 31.2	−2 3 5.8	+3.26	0.958 7405	0.952 8347	0.951 2361
Sept. 4	57 40 20.0	2 12.40	1 31.4	2 2 52.7	3.28	0.958 7078	0.949 6366	0.948 0379
8	57 49 9.6	2 12.42	1 31.6	2 2 39.5	3.29	0.958 6752	0.946 4419	0.944 8506
12	57 57 59.4	2 12.44	1 31.8	2 2 26.4	3.30	0.958 6427	0.943 2661	0.941 6906
16	58 6 49.2	2 12.46	1 31.9	2 2 13.1	3.32	0.958 6104	0.940 1262	0.938 5749
20	58 15 39.1	2 12.48	−1 32.1	−2 1 59.8	+3.33	0.958 5782	0.937 0388	0.935 5200
24	58 24 29.1	2 12.50	1 32.2	2 1 46.5	3.34	0.958 5461	0.934 0205	0.932 5422
28	58 33 19.1	2 12.52	1 32.4	2 1 33.1	3.35	0.958 5141	0.931 0872	0.929 6576
Oct. 2	58 42 9.2	2 12.54	1 32.6	2 1 19.7	3.36	0.958 4823	0.928 2555	0.926 8830
6	58 50 59.4	2 12.56	1 32.7	2 1 6.2	3.38	0.958 4506	0.925 5426	0.924 2366
10	58 59 49.7	2 12.58	−1 32.9	−2 0 52.7	+3.39	0.958 4190	0.922 9673	0.921 7370
14	59 8 40.0	2 12.60	1 33.0	2 0 39.1	3.40	0.958 3875	0.920 5480	0.919 4023
18	59 17 30.4	2 12.62	1 33.2	2 0 25.4	3.42	0.958 3562	0.918 3018	0.917 2486
22	59 26 20.9	2 12.64	1 33.3	2 0 11.8	3.43	0.958 3250	0.916 2446	0.915 2916
26	59 35 11.5	2 12.65	1 33.5	1 59 58.0	3.44	0.958 2939	0.914 3911	0.913 5448
30	59 44 2.2	2 12.67	−1 33.6	−1 59 44.2	+3.45	0.958 2630	0.912 7545	0.912 0217
Nov. 3	59 52 52.9	2 12.69	1 33.8	1 59 30.4	3.46	0.958 2322	0.911 3480	0.910 7350
7	60 1 43.7	2 12.71	1 33.9	1 59 16.5	3.48	0.958 2015	0.910 1842	0.909 6969
11	60 10 34.5	2 12.73	1 34.0	1 59 2.6	3.49	0.958 1709	0.909 2742	0.908 9170
15	60 19 25.5	2 12.75	1 34.2	1 58 48.6	3.50	0.958 1405	0.908 6260	0.908 4018
19	60 28 16.5	2 12.76	−1 34.3	−1 58 34.6	+3.51	0.958 1102	0.908 2447	0.908 1550
23	60 37 7.6	2 12.78	1 34.4	1 58 20.5	3.53	0.958 0800	0.908 1330	0.908 1785
27	60 45 58.7	2 12.80	1 34.6	1 58 6.4	3.54	0.958 0499	0.908 2915	0.908 4719
Dec. 1	60 54 50.0	2 12.82	1 34.7	1 57 52.2	3.55	0.958 0200	0.908 7196	0.909 0342
5	61 3 41.3	2 12.84	1 34.8	1 57 38.0	3.56	0.957 9902	0.909 4152	0.909 8622
9	61 12 32.6	2 12.85	−1 34.9	−1 57 23.7	+3.57	0.957 9605	0.910 3741	0.910 9499
13	61 21 24.1	2 12.87	1 35.0	1 57 9.4	3.59	0.957 9310	0.911 5884	0.912 2881
17	61 30 15.6	2 12.89	1 35.2	1 56 55.0	3.60	0.957 9016	0.913 0476	0.913 8651
21	61 39 7.2	2 12.91	1 35.3	1 56 40.6	3.61	0.957 8723	0.914 7391	0.915 6678
25	61 47 58.9	2 12.92	1 35.4	1 56 26.1	3.62	0.957 8431	0.916 6493	0.917 6820
29	61 56 50.6	2 12.94	−1 35.5	−1 56 11.6	+3.64	0.957 8141	0.918 7640	0.919 8936
33	62 5 42.4	2 12.96	−1 35.6	−1 55 57.0	+3.65	0.957 7852	0.921 0688	0.922 2874

URANUS.

GREENWICH MEAN NOON.

Date.	Heliocentric Longitude, Mean Equinox of Date.	Daily Motion.	Reduction to Orbit.	Heliocentric Latitude.	Daily Motion.	Logarithm of Radius Vector.	Logarithm of Distance from Earth— At Date.	Logarithm of Distance from Earth— At Intermediate Date.
	° ′ ″	″	″	° ′ ″	″			
Jan. 4	299 13 56.6	40.02	+9.4	−0 33 7.9	−0.38	1.295 5110	1.315 8088	1.316 1677
12	299 19 16.7	40.01	9.4	0 33 11.0	0.38	1.295 5368	1.316 4328	1.316 6033
20	299 24 36.8	40.01	9.4	0 33 14.0	0.38	1.295 5626	1.316 6784	1.316 6577
28	299 29 56.9	40.01	9.4	0 33 16.9	0.38	1.295 5883	1.316 5415	1.316 3311
Feb. 5	299 35 16.9	40.00	9.4	0 33 19.9	0.38	1.295 6140	1.316 0278	1.315 6327
13	299 40 36.9	40.00	+9.4	−0 33 22.9	−0.37	1.295 6397	1.315 1468	1.314 5719
21	299 45 56.9	39.99	9.4	0 33 25.9	0.37	1.295 6653	1.313 9104	1.313 1651
29	299 51 16.8	39.99	9.4	0 33 28.9	0.37	1.295 6909	1.312 3395	1.311 4373
Mar. 8	299 56 36.7	39.99	9.4	0 33 31.9	0.37	1.295 7164	1.310 4617	1.309 4162
16	300 1 56.6	39.98	9.4	0 33 34.8	0.37	1.295 7419	1.308 3049	1.307 1323
24	300 7 16.4	39.98	+9.4	−0 33 37.8	−0.37	1.295 7674	1.305 9035	1.304 6240
Apr. 1	300 12 36.2	39.97	9.4	0 33 40.8	0.37	1.295 7928	1.303 2994	1.301 9350
9	300 17 56.0	39.97	9.4	0 33 43.7	0.37	1.295 8182	1.300 5361	1.299 1085
17	300 23 15.8	39.97	9.4	0 33 46.7	0.37	1.295 8435	1.297 6585	1.296 1930
25	300 28 35.4	39.96	9.4	0 33 49.6	0.37	1.295 8688	1.294 7188	1.293 2428
May 3	300 33 55.2	39.96	+9.4	−0 33 52.6	−0.37	1.295 8941	1.291 7715	1.290 3113
11	300 39 14.8	39.95	9.4	0 33 55.5	0.37	1.295 9193	1.288 8689	1.287 4513
19	300 44 34.4	39.95	9.4	0 33 58.5	0.37	1.295 9445	1.286 0659	1.284 7201
27	300 49 54.0	39.95	9.3	0 34 1.4	0.37	1.295 9696	1.283 4205	1.282 1736
June 4	300 55 13.5	39.94	9.3	0 34 4.3	0.37	1.295 9947	1.280 9853	1.279 8617
12	301 0 33.1	39.94	+9.3	−0 34 7.2	−0.37	1.296 0198	1.278 8088	1.277 8331
20	301 5 52.5	39.93	9.3	0 34 10.1	0.36	1.296 0448	1.276 9403	1.276 1351
28	301 11 12.0	39.93	9.3	0 34 13.0	0.36	1.296 0698	1.275 4218	1.274 8041
July 6	301 16 31.4	39.93	9.3	0 34 15.9	0.36	1.296 0947	1.274 2853	1.273 8689
14	301 21 50.8	39.92	9.3	0 34 18.9	0.36	1.296 1196	1.273 5578	1.273 3544
22	301 27 10.2	39.92	+9.3	−0 34 21.7	−0.36	1.296 1444	1.273 2598	1.273 2742
30	301 32 29.5	39.91	9.3	0 34 24.6	0.36	1.296 1692	1.273 3974	1.273 6290
Aug. 7	301 37 48.8	39.91	9.3	0 34 27.5	0.36	1.296 1939	1.273 9679	1.274 4130
15	301 43 8.0	39.91	9.3	0 34 30.5	0.36	1.296 2186	1.274 9623	1.275 6126
23	301 48 27.3	39.90	9.3	0 34 33.2	0.36	1.296 2433	1.276 3597	1.277 1994
31	301 53 46.5	39.90	+9.3	−0 34 36.1	−0.36	1.296 2679	1.278 1273	1.279 1386
Sept. 8	301 59 5.6	39.89	9.3	0 34 39.0	0.36	1.296 2925	1.280 2286	1.281 3916
16	302 4 24.7	39.89	9.3	0 34 41.8	0.36	1.296 3170	1.282 6212	1.283 9105
24	302 9 43.8	39.89	9.3	0 34 44.7	0.36	1.296 3415	1.285 2525	1.286 6405
Oct. 2	302 15 2.9	39.88	9.3	0 34 47.5	0.36	1.296 3660	1.288 0679	1.289 5280
10	302 20 21.9	39.88	+9.3	−0 34 50.4	−0.35	1.296 3904	1.291 0137	1.292 5173
18	302 25 40.9	39.87	9.3	0 34 53.2	0.35	1.296 4148	1.294 0312	1.295 5480
26	302 30 59.9	39.87	9.3	0 34 56.0	0.35	1.296 4391	1.297 0608	1.298 5629
Nov. 3	302 36 18.9	39.87	9.3	0 34 58.8	0.35	1.296 4634	1.300 0479	1.301 5093
11	302 41 37.8	39.86	9.3	0 35 1.7	0.35	1.296 4876	1.302 9402	1.304 3338
19	302 46 56.7	39.86	+9.3	−0 35 4.5	−0.35	1.296 5118	1.305 6841	1.306 9855
27	302 52 15.5	39.85	9.3	0 35 7.3	0.35	1.296 5360	1.308 2331	1.309 4220
Dec. 5	302 57 34.3	39.85	9.3	0 35 10.1	0.35	1.296 5601	1.310 5474	1.311 6042
13	303 2 53.1	39.85	9.3	0 35 12.9	0.35	1.296 5842	1.312 5881	1.313 4950
21	303 8 11.9	39.84	9.3	0 35 15.7	0.35	1.296 6082	1.314 3216	1.315 0654
29	303 13 30.6	39.84	+9.3	−0 35 18.5	−0.35	1.296 6322	1.315 7241	1.316 2948
37	303 18 49.3	39.83	+9.3	−0 35 21.2	−0.35	1.296 6561	1.316 7749	....

NEPTUNE.

GREENWICH MEAN NOON.

Date.	Heliocentric Longitude, Mean Equinox of Date.	Daily Motion.	Reduction to Orbit.	Heliocentric Latitude.	Daily Motion.	Logarithm of Radius Vector.	Logarithm of Distance from Earth— At Date.	Logarithm of Distance from Earth— At Intermediate Date.
	° ′ ″	″	″	° ′ ″	″			
Jan. 4	112 20 36.5	21.78	−29.8	−0 33 49.1	+0.64	1.476 7116	1.462 4375	1.462 2968
12	112 23 30.7	21.77	29.8	0 33 43.9	0.64	1.476 7140	1.462 2300	1.462 2381
20	112 26 24.9	21.77	29.7	0 33 38.8	0.64	1.476 7165	1.462 3217	1.462 4800
28	112 29 19.1	21.77	29.7	0 33 33.7	0.64	1.476 7189	1.462 7114	1.463 0143
Feb. 5	112 32 13.3	21.77	29.6	0 33 28.6	0.64	1.476 7214	1.463 3868	1.463 8267
13	112 35 7.5	21.77	−29.5	−0 33 23.5	+0.64	1.476 7239	1.464 3314	1.464 8982
21	112 38 1.6	21.77	29.5	0 33 18.4	0.64	1.476 7264	1.465 5238	1.466 2043
29	112 40 55.8	21.77	29.4	0 33 13.3	0.64	1.476 7289	1.466 9354	1.467 7130
Mar. 8	112 43 50.0	21.77	29.3	0 33 8.2	0.64	1.476 7314	1.468 5330	1.469 3910
16	112 46 44.1	21.77	29.2	0 33 3.1	0.64	1.476 7339	1.470 2825	1.471 2024
24	112 49 38.3	21.77	−29.2	−0 32 57.9	+0.64	1.476 7364	1.472 1458	1.473 1077
Apr. 1	112 52 32.5	21.77	29.1	0 32 52.8	0.64	1.476 7389	1.474 0834	1.475 0683
9	112 55 26.6	21.77	29.0	0 32 47.7	0.64	1.476 7414	1.476 0580	1.477 0480
17	112 58 20.8	21.77	29.0	0 32 42.6	0.64	1.476 7439	1.478 0335	1.479 0096
25	113 1 14.9	21.77	28.9	0 32 37.5	0.64	1.476 7465	1.479 9717	1.480 9157
May 3	113 4 9.0	21.77	−28.8	−0 32 32.3	+0.64	1.476 7490	1.481 8378	1.482 7344
11	113 7 3.1	21.77	28.8	0 32 27.2	0.64	1.476 7516	1.483 6020	1.484 4370
19	113 9 57.3	21.77	28.7	0 32 22.1	0.64	1.476 7541	1.485 2358	1.485 9950
27	113 12 51.4	21.77	28.7	0 32 17.0	0.64	1.476 7567	1.486 7118	1.487 3837
June 4	113 15 45.5	21.76	28.6	0 32 11.8	0.64	1.476 7592	1.488 0084	1.488 5837
12	113 18 39.6	21.76	−28.5	−0 32 6.7	+0.64	1.476 7618	1.489 1073	1.489 5772
20	113 21 33.7	21.76	28.4	0 32 1.6	0.64	1.476 7644	1.489 9915	1.490 3488
28	113 24 27.8	21.76	28.4	0 31 56.4	0.64	1.476 7670	1.490 6481	1.490 8884
July 6	113 27 21.9	21.76	28.3	0 31 51.3	0.64	1.476 7696	1.491 0689	1.491 1888
14	113 30 16.0	21.76	28.2	0 31 46.2	0.64	1.476 7722	1.491 2475	1.491 2446
22	113 33 10.1	21.76	−28.2	−0 31 41.0	+0.64	1.476 7748	1.491 1804	1.491 0554
30	113 36 4.2	21.76	28.1	0 31 35.9	0.64	1.476 7774	1.490 8697	1.490 6235
Aug. 7	113 38 58.3	21.76	28.1	0 31 30.7	0.64	1.476 7800	1.490 3178	1.489 9537
15	113 41 52.4	21.76	28.0	0 31 25.6	0.64	1.476 7826	1.489 5324	1.489 0554
23	113 44 46.4	21.76	27.9	0 31 20.4	0.64	1.476 7852	1.488 5245	1.487 9417
31	113 47 40.5	21.76	−27.8	−0 31 15.3	+0.64	1.476 7878	1.487 3092	1.486 6291
Sept. 8	113 50 34.6	21.76	27.7	0 31 10.2	0.64	1.476 7904	1.485 9036	1.485 1353
16	113 53 28.6	21.76	27.7	0 31 5.0	0.64	1.476 7930	1.484 3273	1.483 4832
24	113 56 22.7	21.76	27.6	0 30 59.9	0.64	1.476 7956	1.482 6068	1.481 7017
Oct. 2	113 59 16.7	21.76	27.5	0 30 54.7	0.64	1.476 7983	1.480 7715	1.479 8199
10	114 2 10.8	21.76	−27.5	−0 30 49.6	+0.64	1.476 8009	1.478 8505	1.477 8676
18	114 5 4.8	21.76	27.4	0 30 44.4	0.64	1.476 8036	1.476 8763	1.475 8818
26	114 7 58.9	21.75	27.3	0 30 39.3	0.64	1.476 8063	1.474 8886	1.473 9013
Nov. 3	114 10 52.9	21.75	27.3	0 30 34.1	0.64	1.476 8090	1.472 9244	1.471 9629
11	114 13 46.9	21.75	27.2	0 30 29.0	0.64	1.476 8117	1.471 0219	1.470 1065
19	114 16 40.9	21.75	−27.1	−0 30 23.8	+0.65	1.476 8144	1.469 2217	1.468 3724
27	114 19 35.0	21.75	27.0	0 30 18.7	0.65	1.476 8171	1.467 5630	1.466 7976
Dec. 5	114 22 29.0	21.75	27.0	0 30 13.5	0.65	1.476 8198	1.466 0807	1.465 4167
13	114 25 23.0	21.75	26.9	0 30 8.3	0.65	1.476 8225	1.464 8097	1.464 2633
21	114 28 17.0	21.75	26.8	0 30 3.2	0.65	1.476 8252	1.463 7806	1.463 3642
29	114 31 11.0	21.75	−26.8	−0 29 58.0	+0.65	1.476 8279	1.463 0163	1.462 7389
37	114 34 5.0	21.75	−26.7	−0 29 52.9	+0.65	1.476 8307	1.462 5337	—

FOR GREENWICH MEAN NOON AND MIDNIGHT.

Date.	X		Reduc. to Mean Eq'x of Jan. 0.	Y		Reduc. to Mean Eq'x of Jan. 0.	Z		Reduc. to Mean Eq'x of Jan. 0.
	True Equinox.			True Equinox.			True Equinox.		
	Noon.	*Midnight.*	*Noon.*	*Noon.*	*Midnight.*	*Noon.*	*Noon.*	*Midnight.*	*Noon.*
Jan. 1	+0.166 2589	+0.174 8693	+342	−0.889 0063	−0.887 6099	−88	−0.385 6784	−0.385 0724	+352
2	0.183 4658	0.192 0479	331	0.886 1447	0.884 6110	84	0.384 4365	0.383 7709	353
3	0.200 6149	0.209 1664	321	0.883 0089	0.881 3384	80	0.383 0756	0.382 3507	353
4	0.217 7016	0.226 2199	310	0.879 5996	0.877 7928	76	0.381 5963	0.380 8124	354
5	0.234 7208	0.243 2037	300	0.875 9181	0.873 9755	73	0.379 9991	0.379 1564	354
6	+0.251 6679	+0.260 1128	+290	−0.871 9653	−0.869 8876	−70	−0.378 2844	−0.377 3832	+354
7	0.268 5378	0.276 9423	280	0.867 7424	0.865 5298	67	0.376 4527	0.375 4931	354
8	0.285 3256	0.293 6871	270	0.863 2499	0.860 9031	64	0.374 5043	0.373 4865	354
9	0.302 0262	0.310 3423	260	0.858 4895	0.856 0090	62	0.372 4396	0.371 3638	354
10	0.318 6346	0.326 9025	250	0.853 4619	0.850 8483	60	0.370 2591	0.369 1256	354
11	+0.335 1454	+0.343 3626	+240	−0.848 1685	−0.845 4225	−58	−0.367 9634	−0.366 7725	+353
12	0.351 5535	0.359 7173	230	0.842 6106	0.839 7329	56	0.365 5530	0.364 3049	352
13	0.367 8535	0.375 9614	220	0.836 7897	0.833 7812	55	0.363 0283	0.361 7235	351
14	0.384 0402	0.392 0893	210	0.830 7075	0.827 5690	54	0.360 3905	0.359 0293	350
15	0.400 1080	0.408 0958	201	0.824 3658	0.821 0982	53	0.357 6399	0.356 2226	348
16	+0.416 0520	+0.423 9758	+191	−0.817 7664	−0.814 3707	−52	−0.354 7774	−0.353 3044	+346
17	0.431 8667	0.439 7241	182	0.810 9116	0.807 3893	52	0.351 8039	0.350 2760	344
18	0.447 5472	0.455 3355	173	0.803 8038	0.800 1554	52	0.348 7206	0.347 1378	342
19	0.463 0882	0.470 8047	164	0.796 4445	0.792 6716	52	0.345 5279	0.343 8911	339
20	0.478 4844	0.486 1268	155	0.788 8369	0.784 9407	52	0.342 2275	0.340 5371	337
21	+0.493 7313	+0.501 2971	+146	−0.780 9833	−0.776 9651	−52	−0.338 8202	−0.337 0769	+334
22	0.508 8237	0.516 3104	137	0.772 8865	0.768 7477	53	0.335 3073	0.333 5116	331
23	0.523 7566	0.531 1619	129	0.764 5491	0.760 2912	54	0.331 6899	0.329 8424	328
24	0.538 5256	0.545 8471	120	0.755 9742	0.751 5986	55	0.327 9693	0.326 0708	325
25	0.553 1259	0.560 3615	112	0.747 1648	0.742 6732	56	0.324 1470	0.322 1980	321
26	+0.567 5532	+0.574 7005	+104	−0.738 1241	−0.733 5179	−57	−0.320 2241	−0.318 2255	+317
27	0.581 8029	0.588 8598	96	0.728 8551	0.724 1362	59	0.316 2024	0.314 1548	313
28	0.595 8709	0.602 8356	88	0.719 3614	0.714 5311	60	0.312 0830	0.309 9872	309
29	0.609 7534	0.616 6237	81	0.709 6458	0.704 7059	62	0.307 8675	0.305 7243	304
30	0.623 4462	0.630 2204	74	0.699 7119	0.694 6642	64	0.303 5576	0.301 3677	300
31	+0.636 9459	+0.643 6220	+67	−0.689 5631	−0.684 4091	−66	−0.299 1547	−0.296 9187	+295
Feb. 1	0.650 2485	0.656 8249	60	0.679 2025	0.673 9439	68	0.294 6599	0.292 3785	290
2	0.663 3508	0.669 8256	53	0.668 6336	0.663 2719	71	0.290 0748	0.287 7488	285
3	0.676 2489	0.682 6204	47	0.657 8592	0.652 3958	73	0.285 4008	0.283 0308	280
4	0.688 9395	0.695 2059	41	0.646 8822	0.641 3189	76	0.280 6391	0.278 2258	274
5	+0.701 4190	+0.707 5784	+35	−0.635 7063	−0.630 0447	−78	−0.275 7912	−0.273 3353	+269
6	0.713 6836	0.719 7342	29	0.624 3345	0.618 5761	81	0.270 8583	0.268 3605	263
7	0.725 7297	0.731 6697	24	0.612 7699	0.606 9164	83	0.265 8420	0.263 3029	257
8	0.737 5536	0.743 3811	19	0.601 0159	0.595 0688	86	0.260 7434	0.258 1637	251
9	0.749 1516	0.754 8648	14	0.589 0757	0.583 0371	89	0.255 5640	0.252 9446	245
10	+0.760 5200	+0.766 1168	+9	−0.576 9534	−0.570 8249	−92	−0.250 3056	−0.247 6472	+239
11	0.771 6548	0.777 1337	5	0.564 6521	0.558 4356	95	0.244 9695	0.242 2729	233
12	0.782 5530	0.787 9121	+1	0.552 1758	0.545 8733	98	0.239 5574	0.236 8233	226
13	0.793 2107	0.798 4483	−3	0.539 5285	0.533 1419	101	0.234 0708	0.231 3002	220
14	0.803 6245	0.808 7389	7	0.526 7141	0.520 2454	104	0.228 5117	0.225 7054	213
15	+0.813 7912	+0.818 7809	−11	−0.513 7365	−0.507 1878	−107	−0.222 8816	−0.220 0406	+206
16	+0.823 7075	+0.828 5707	−14	−0.500 6000	−0.493 9736	−110	−0.217 1825	−0.214 3076	+199

FOR GREENWICH MEAN NOON AND MIDNIGHT.

Date.	X True Equinox.		Reduc. to Mean Eq'x of Jan. 0.	Y True Equinox.		Reduc. to Mean Eq'x of Jan. 0.	Z True Equinox.		Reduc. to Mean Eq'x of Jan. 0.
	Noon.	*Midnight.*	*Noon.*	*Noon.*	*Midnight.*	*Noon.*	*Noon.*	*Midnight.*	*Noon.*
Feb. 16	+0.823 7075	+0.828 5707	−14	−0.500 6000	−0.493 9736	−110	−0.217 1825	−0.214 3076	+199
17	0.833 3701	0.838 1054	17	0.487 3091	0.480 6070	113	0.211 4162	0.208 5085	192
18	0.842 7762	0.847 3820	20	0.473 8678	0.467 0922	116	0.205 5847	0.202 6450	184
19	0.851 9225	0.856 3974	23	0.460 2808	0.453 4340	119	0.199 6897	0.196 7190	177
20	0.860 8065	0.865 1493	25	0.446 5524	0.439 6366	122	0.193 7332	0.190 7326	169
21	+0.869 4256	+0.873 6350	−27	-0.432 6872	−0.425 7048	−125	−0.187 7174	−0.184 6878	+161
22	0.877 7772	0.881 8520	29	0.418 6900	0.411 6434	128	0.181 6442	0.178 5868	153
23	0.885 8591	0.889 7983	31	0.404 5656	0.397 4571	131	0.175 5159	0.172 4316	145
24	0.893 6692	0.897 4716	33	0.390 3184	0.383 1502	134	0.169 3343	0.166 2242	137
25	0.901 2053	0.904 8700	34	0.375 9532	0.368 7279	137	0.163 1016	0.159 9667	129
26	+0.908 4656	+0.911 9920	−35	−0.361 4748	−0.354 1946	−140	−0.156 8198	−0.153 6612	+121
27	0.915 4488	0.918 8359	36	0.346 8877	0.339 5548	143	0.150 4911	0.147 3098	113
28	0.922 1531	0.925 4003	36	0.332 1964	0.324 8131	146	0.144 1174	0.140 9143	105
29	0.928 5773	0.931 6839	37	0.317 4056	0.309 9744	149	0.137 7006	0.134 4767	97
Mar. 1	0.934 7200	0.937 6853	37	0.302 5200	0.295 0427	152	0.131 2428	0.127 9991	88
2	+0.940 5798	+0.943 4033	−37	−0.287 5432	−0.280 0222	−155	−0.124 7458	−0.121 4831	+ 80
3	0.946 1557	0.948 8366	36	0.272 4801	0.264 9175	158	0.118 2112	0.114 9306	71
4	0.951 4460	0.953 9838	36	0.257 3348	0.249 7326	161	0.111 6413	0.108 3435	62
5	0.956 4498	0.958 8437	35	0.242 1115	0.234 4720	163	0.105 0374	0.101 7235	53
6	0.961 1654	0.963 4147	34	0.226 8145	0.219 1397	166	0.098 4018	0.095 0724	44
7	+0.965 5915	+0.967 6956	−33	−0.211 4482	−0.203 7404	−168	−0.091 7358	−0.088 3922	+ 35
8	0.969 7269	0.971 6851	32	0.196 0169	0.188 2784	171	0.085 0418	0.081 6849	26
9	0.973 5701	0.975 3818	31	0.180 5254	0.172 7584	173	0.078 3216	0.074 9523	17
10	0.977 1200	0.978 7846	29	0.164 9781	0.157 1849	176	0.071 5771	0.068 1963	+ 8
11	0.980 3754	0.981 8923	27	0.149 3796	0.141 5627	178	0.064 8102	0.061 4191	− 1
12	+0.983 3353	+0.984 7042	−25	−0.133 7348	−0.125 8966	−181	−0.058 0232	−0.054 6227	− 10
13	0.985 9988	0.987 2191	23	0.118 0486	0.110 1914	183	0.051 2179	0.047 8091	19
14	0.988 3650	0.989 4363	21	0.102 3255	0.094 4517	186	0.044 3966	0.040 9805	29
15	0.990 4330	0.991 3550	18	0.086 5705	0.078 6826	188	0.037 5612	0.034 1390	38
16	0.992 2023	0.992 9749	15	0.070 7887	0.062 8894	190	0.030 7141	0.027 2868	47
17	+0.993 6727	+0.994 2956	−12	−0.054 9851	−0.047 0765	−192	−0.023 8573	−0.020 4260	− 56
18	0.994 8435	0.995 3164	9	0.039 1643	0.031 2491	194	0.016 9931	0.013 5589	65
19	0.995 7143	0.996 0373	5	0.023 3316	−0.015 4123	196	0.010 1236	−0.006 6876	74
20	0.996 2854	0.996 4587	− 2	−0.007 4920	+0.000 4286	198	−0.003 2511	+0.000 1856	83
21	0.996 5571	0.996 5806	+ 2	+0.008 3491	0.016 2688	200	+0.003 6222	0.007 0584	92
22	+0.996 5293	+0.996 4033	+ 6	+0.024 1871	+0.032 1032	−202	+0.010 4939	+0.013 9286	−101
23	0.996 2026	0.995 9273	10	0.040 0165	0.047 9266	204	0.017 3621	0.020 7942	110
24	0.995 5776	0.995 1536	14	0.055 8329	0.063 7347	206	0.024 2245	0.027 6528	119
25	0.994 6553	0.994 0828	19	0.071 6313	0.079 5221	207	0.031 0788	0.034 5023	127
26	0.993 4364	0.992 7161	24	0.087 4066	0.095 2842	209	0.037 9230	0.041 3406	136
27	+0.991 9222	+0.991 0548	+29	+0.103 1544	+0.111 0165	−210	+0.044 7550	+0.048 1659	−145
28	0.990 1139	0.989 0996	34	0.118 8701	0.126 7146	211	0.051 5730	0.054 9761	154
29	0.988 0121	0.986 8516	39	0.134 5494	0.142 3740	212	0.058 3750	0.061 7694	162
30	0.985 6183	0.984 3123	44	0.150 1878	0.157 9903	214	0.065 1591	0.068 5439	171
31	0.982 9337	0.981 4828	50	0.165 7810	0.173 5594	215	0.071 9235	0.075 2977	179
Apr. 1	+0.979 9597	+0.978 3644	+55	+0.181 3249	+0.189 0770	−216	+0.078 6664	+0.082 0292	−188
2	+0.976 6970	+0.974 9578	+61	+0.196 8152	+0.204 5390	−217	+0.085 3859	+0.088 7364	−196

SUN'S CO-ORDINATES, 1912.

FOR GREENWICH MEAN NOON AND MIDNIGHT.

Date.	X True Equinox.		Reduc. to Mean Eq'x of Jan. 0.	Y True Equinox.		Reduc. to Mean Eq'x of Jan. 0.	Z True Equinox.		Reduc. to Mean Eq'x of Jan. 0.
	Noon.	*Midnight.*	*Noon.*	*Noon.*	*Midnight.*	*Noon.*	*Noon.*	*Midnight.*	*Noon.*
Apr. 1	+0.979 9597	+0.978 3644	+ 55	+0.181 3249	+0.189 0770	−216	+0.078 6664	+0.082 0292	−188
2	0.976 6970	0.974 9578	61	0.196 8152	0.204 5390	217	0.085 3859	0.088 7364	196
3	0.973 1469	0.971 2645	67	0.212 2478	0.219 9412	218	0.092 0805	0.095 4179	205
4	0.969 3106	0.967 2853	73	0.227 6186	0.235 2794	219	0.098 7483	0.102 0715	213
5	0.965 1888	0.963 0214	79	0.242 9231	0.250 5492	220	0.105 3873	0.108 6956	221
6	+0.960 7831	+0.958 4740	+ 86	+0.258 1571	+0.265 7462	−221	+0.111 9960	+0.115 2882	−229
7	0.956 0943	0.953 6442	93	0.273 3161	0.280 8664	222	0.118 5721	0.121 8476	237
8	0.951 1240	0.948 5337	100	0.288 3963	0.295 9053	223	0.125 1143	0.128 3719	245
9	0.945 8736	0.943 1438	107	0.303 3928	0.310 8583	224	0.131 6202	0.134 8590	253
10	0.940 3445	0.937 4760	114	0.318 3011	0.325 7209	225	0.138 0880	0.141 3071	261
11	+0.934 5384	+0.931 5319	+121	+0.333 1171	+0.340 4892	−226	+0.144 5159	+0.147 7142	−269
12	0.928 4568	0.925 3133	129	0.347 8365	0.355 1583	226	0.150 9019	0.154 0787	276
13	0.922 1017	0.918 8221	137	0.362 4542	0.369 7239	227	0.157 2442	0.160 3983	284
14	0.915 4749	0.912 0603	145	0.376 9666	0.384 1818	227	0.163 5407	0.166 6712	291
15	0.908 5786	0.905 0299	153	0.391 3688	0.398 5271	227	0.169 7895	0.172 8954	298
16	+0.901 4146	+0.897 7330	+161	+0.405 6563	+0.412 7558	−227	+0.175 9887	+0.179 0691	−305
17	0.893 9854	0.890 1720	169	0.419 8250	0.426 8632	227	0.182 1363	0.185 1902	312
18	0.886 2934	0.882 3499	178	0.433 8701	0.440 8451	227	0.188 2304	0.191 2567	319
19	0.878 3418	0.874 2693	187	0.447 7877	0.454 6973	227	0.194 2689	0.197 2669	326
20	0.870 1328	0.865 9328	196	0.461 5735	0.468 4156	226	0.200 2503	0.203 2189	332
21	+0.861 6696	+0.857 3437	+205	+0.475 2232	+0.481 9959	−225	+0.206 1725	+0.209 1109	−339
22	0.852 9554	0.848 5050	214	0.488 7331	0.495 4344	224	0.212 0339	0.214 9412	345
23	0.843 9931	0.839 4200	223	0.502 0994	0.508 7274	224	0.217 8327	0.220 7081	351
24	0.834 7862	0.830 0920	233	0.515 3180	0.521 8710	223	0.223 5673	0.226 4101	357
25	0.825 3379	0.820 5241	243	0.528 3858	0.534 8620	222	0.229 2364	0.232 0458	363
26	+0.815 6511	+0.810 7194	+253	+0.541 2992	+0.547 6971	−221	+0.234 8383	+0.237 6136	−369
27	0.805 7294	0.800 6814	263	0.554 0551	0.560 3728	220	0.240 3716	0.243 1121	375
28	0.795 5758	0.790 4130	273	0.566 6499	0.572 8860	219	0.245 8350	0.248 5401	380
29	0.785 1934	0.779 9174	283	0.579 0807	0.585 2337	218	0.251 2273	0.253 8963	385
30	0.774 5855	0.769 1979	294	0.591 3445	0.597 4126	216	0.256 5470	0.259 1792	390
May 1	+0.763 7551	+0.758 2574	+305	+0.603 4377	+0.609 4196	−215	+0.261 7927	+0.264 3875	−394
2	0.752 7051	0.747 0987	316	0.615 3578	0.621 2517	213	0.266 9634	0.269 5201	398
3	0.741 4387	0.735 7254	327	0.627 1011	0.632 9056	211	0.272 0575	0.274 5755	402
4	0.729 9591	0.724 1403	338	0.638 6648	0.644 3784	209	0.277 0738	0.279 5524	406
5	0.718 2693	0.712 3465	349	0.650 0459	0.655 6668	207	0.282 0110	0.284 4495	410
6	+0.706 3723	+0.700 3472	+360	+0.661 2409	+0.666 7677	−204	+0.286 8676	+0.289 2652	−413
7	0.694 2716	0.688 1459	371	0.672 2469	0.677 6780	202	0.291 6422	0.293 9984	417
8	0.681 9705	0.675 7459	383	0.683 0606	0.688 3944	199	0.296 3337	0.298 6477	420
9	0.669 4726	0.663 1509	394	0.693 6789	0.698 9138	196	0.300 9404	0.303 2117	424
10	0.656 7812	0.650 3641	406	0.704 0988	0.709 2334	193	0.305 4614	0.307 6892	427
11	+0.643 8999	+0.637 3892	+418	+0.714 3172	+0.719 3500	−190	+0.309 8950	+0.312 0786	−431
12	0.630 8324	0.624 2299	430	0.724 3312	0.729 2605	186	0.314 2399	0.316 3787	434
13	0.617 5823	0.610 8901	442	0.734 1375	0.738 9619	182	0.318 4948	0.320 5881	437
14	0.604 1537	0.597 3737	454	0.743 7333	0.748 4513	178	0.322 6585	0.324 7057	440
15	0.590 5505	0.583 6847	466	0.753 1155	0.757 7256	174	0.326 7296	0.328 7300	442
16	+0.576 7769	+0.569 8276	+479	+0.762 2813	+0.766 7822	−170	+0.330 7067	+0.332 6597	−444
17	*+0.562 8373*	+0.555 8066	+491	+0.771 2280	+0.775 6183	−166	+0.334 5887	+0.336 4935	−446

FOR GREENWICH MEAN NOON AND MIDNIGHT.

Date.	X True Equinox.		Reduc. to Mean Eq'x of Jan. 0.	Y True Equinox.		Reduc. to Mean Eq'x of Jan. 0.	Z True Equinox.		Reduc. to Mean Eq'x of Jan. 0.
	Noon.	*Midnight.*	*Noon.*	*Noon.*	*Midnight.*	*Noon.*	*Noon.*	*Midnight.*	*Noon.*
May 17	+0.562 8373	+0.555 8066	+491	+0.771 2280	+0.775 6183	−166	+0.334 5887	+0.336 4935	−446
18	0.548 7361	0.541 6263	504	0.779 9528	0.784 2312	161	0.338 3741	0.340 2304	448
19	0.534 4778	0.527 2912	516	0.788 4533	0.792 6187	156	0.342 0622	0.343 8693	449
20	0.520 0672	0.512 8062	529	0.796 7271	0.800 7783	151	0.345 6517	0.347 4092	450
21	0.505 5087	0.498 1753	541	0.804 7720	0.808 7081	146	0.349 1418	0.350 8493	451
22	+0.490 8067	+0.483 4035	+554	+0.812 5863	+0.816 4062	−140	+0.352 5316	+0.354 1887	−452
23	0.475 9663	0.468 4956	566	0.820 1677	0.823 8708	134	0.355 8204	0.357 4267	452
24	0.460 9919	0.453 4558	579	0.827 5151	0.831 1003	128	0.359 0074	0.360 5624	452
25	0.445 8879	0.438 2886	591	0.834 6264	0.838 0931	121	0.362 0917	0.363 5953	452
26	0.430 6586	0.422 9984	604	0.841 5003	0.844 8477	114	0.365 0731	0.366 5249	452
27	+0.415 3086	+0.407 5896	+617	+0.848 1351	+0.851 3623	−107	+0.367 9507	+0.369 3505	−451
28	0.399 8419	0.392 0662	630	0.854 5292	0.857 6358	100	0.370 7241	0.372 0715	450
29	0.384 2630	0.376 4328	643	0.860 6817	0.863 6667	92	0.373 3925	0.374 6872	449
30	0.368 5760	0.360 6932	655	0.866 5907	0.869 4535	84	0.375 9554	0.377 1971	448
31	0.352 7850	0.344 8518	668	0.872 2550	0.874 9950	76	0.378 4123	0.379 6008	447
June 1	+0.336 8943	+0.328 9129	+681	+0.877 6733	+0.880 2896	− 68	+0.380 7625	+0.381 8975	−445
2	0.320 9081	0.312 8804	694	0.882 8438	0.885 3358	60	0.383 0056	0.384 0866	443
3	0.304 8305	0.296 7590	706	0.887 7654	0.890 1325	51	0.385 1406	0.386 1675	441
4	0.288 6663	0.280 5529	719	0.892 4368	0.894 6782	42	0.387 1673	0.388 1398	439
5	0.272 4194	0.264 2663	731	0.896 8564	0.898 9714	33	0.389 0850	0.390 0027	437
6	+0.256 0943	+0.247 9038	+743	+0.901 0230	+0.903 0109	− 23	+0.390 8928	+0.391 7554	−434
7	0.239 6953	0.231 4696	755	0.904 9351	0.906 7955	13	0.392 5904	0.393 3978	431
8	0.223 2272	0.214 9685	767	0.908 5919	0.910 3241	− 3	0.394 1774	0.394 9291	428
9	0.206 6943	0.198 4052	779	0.911 9920	0.913 5954	+ 8	0.395 6530	0.396 3490	425
10	0.190 1016	0.181 7842	791	0.915 1341	0.916 6080	19	0.397 0169	0.397 6567	422
11	+0.173 4535	+0.165 1102	+802	+0.918 0170	+0.919 3610	+ 30	+0.398 2683	+0.398 8517	−419
12	0.156 7549	0.148 3883	814	0.920 6399	0.921 8535	41	0.399 4068	0.399 9336	415
13	0.140 0109	0.131 6234	825	0.923 0017	0.924 0845	53	0.400 4320	0.400 9020	411
14	0.123 2264	0.114 8205	836	0.925 1017	0.926 0532	65	0.401 3436	0.401 7566	407
15	0.106 4064	0.097 9848	847	0.926 9389	0.927 7589	77	0.402 1410	0.402 4969	403
16	+0.089 5564	+0.081 1218	+858	+0.928 5131	+0.929 2013	+ 89	+0.402 8241	+0.403 1227	−398
17	0.072 6817	0.064 2366	869	0.929 8235	0.930 3798	102	0.403 3926	0.403 6338	393
18	0.055 7872	0.047 3343	879	0.930 8702	0.931 2947	115	0.403 8464	0.404 0305	388
19	0.038 8783	0.030 4200	889	0.931 6534	0.931 9461	128	0.404 1859	0.404 3127	383
20	0.021 9599	+0.013 4987	899	0.932 1730	0.932 3340	141	0.404 4108	0.404 4804	377
21	+0.005 0369	−0.003 4247	+909	+0.932 4293	+0.932 4589	+155	+0.404 5214	+0.404 5340	−371
22	−0.011 8856	0.020 3454	918	0.932 4229	0.932 3212	169	0.404 5180	0.404 4735	365
23	0.028 8033	0.037 2587	927	0.932 1538	0.931 9209	183	0.404 4005	0.404 2991	359
24	0.045 7111	0.054 1600	936	0.931 6226	0.931 2589	197	0.404 1694	0.404 0113	352
25	0.062 6049	0.071 0450	945	0.930 8299	0.930 3355	212	0.403 8249	0.403 6102	345
26	−0.079 4799	−0.087 9090	+953	+0.929 7759	+0.929 1511	+227	+0.403 3672	+0.403 0960	−338
27	0.096 3318	0.104 7477	961	0.928 4613	0.927 7064	243	0.402 7965	0.402 4688	331
28	0.113 1561	0.121 5565	969	0.926 8865	0.926 0017	258	0.402 1129	0.401 7289	324
29	0.129 9483	0.138 3311	976	0.925 0520	0.924 0375	274	0.401 3168	0.400 8767	317
30	0.146 7042	0.155 0671	983	0.922 9583	0.921 8144	290	0.400 4085	0.399 9123	310
July 1	−0.163 4192	−0.171 7600	+990	+0.920 6059	+0.919 3329	+306	+0.399 3881	+0.398 8359	−302
2	−0.180 0890	−0.188 4055	+996	+0.917 9955	+0.916 5937	+322	+0.398 2558	+0.397 6478	−294

FOR GREENWICH MEAN NOON AND MIDNIGHT.

Date.	X True Equinox.		Reduc. to Mean Eq'x of Jan. 0.	Y True Equinox.		Reduc. to Mean Eq'x of Jan. 0.	Z True Equinox.		Reduc. to Mean Eq'x of Jan. 0.
	Noon.	*Midnight.*	*Noon.*	*Noon.*	*Midnight.*	*Noon.*	*Noon.*	*Midnight.*	*Noon.*
July 1	−0.163 4192	−0.171 7600	+ 990	+0.920 6059	+0.919 3329	+ 306	+0.399 3881	+0.398 8359	−302
2	0.180 0890	0.188 4055	996	0.917 9955	0.916 5937	322	0.398 2558	0.397 6478	294
3	0.196 7090	0.204 9989	1002	0.915 1275	0.913 5971	339	0.397 0119	0.396 3482	286
4	0.213 2747	0.221 5359	1008	0.912 0026	0.910 3440	356	0.395 6568	0.394 9375	278
5	0.229 7819	0.238 0120	1013	0.908 6215	0.906 8351	373	0.394 1905	0.393 4158	269
6	−0.246 2258	−0.254 4226	+1018	+0.904 9848	+0.903 0708	+ 390	+0.392 6135	+0.391 7835	−261
7	0.262 6018	0.270 7630	1022	0.901 0932	0.899 0522	407	0.390 9260	0.390 0409	252
8	0.278 9056	0.287 0289	1026	0.896 9478	0.894 7801	424	0.389 1283	0.388 1882	243
9	0.295 1324	0.303 2154	1030	0.892 5491	0.890 2550	442	0.387 2206	0.386 2256	234
10	0.311 2773	0.319 3175	1034	0.887 8980	0.885 4782	459	0.385 2034	0.384 1540	225
11	−0.327 3354	−0.335 3306	+1037	+0.882 9958	+0.880 4508	+ 477	+0.383 0773	+0.381 9734	−215
12	0.343 3023	0.351 2498	1040	0.877 8434	0.875 1738	495	0.380 8424	0.379 6844	206
13	0.359 1726	0.367 0701	1042	0.872 4422	0.869 6487	513	0.378 4994	0.377 2875	196
14	0.374 9416	0.382 7865	1043	0.866 7935	0.863 8768	531	0.376 0488	0.374 7835	186
15	0.390 6042	0.398 3942	1044	0.860 8990	0.857 8602	550	0.373 4917	0.372 1733	176
16	−0.406 1558	−0.413 8884	+1045	+0.854 7607	+0.851 6007	+ 568	+0.370 8284	+0.369 4573	−166
17	0.421 5914	0.429 2642	1045	0.848 3805	0.845 1003	587	0.368 0600	0.366 6367	156
18	0.436 9064	0.444 5173	1045	0.841 7605	0.838 3612	605	0.365 1875	0.363 7125	146
19	0.452 0965	0.459 6433	1044	0.834 9028	0.831 3856	624	0.362 2118	0.360 6855	135
20	0.467 1572	0.474 6379	1043	0.827 8099	0.824 1760	642	0.359 1339	0.357 5571	124
21	−0.482 0847	−0.489 4971	+1041	+0.820 4841	+0.816 7345	+ 660	+0.355 9551	+0.354 3280	−113
22	0.496 8747	0.504 2169	1039	0.812 9274	0.809 0632	678	0.352 6761	0.350 9994	102
23	0.511 5233	0.518 7934	1036	0.805 1422	0.801 1648	697	0.349 2981	0.347 5723	91
24	0.526 0267	0.533 2228	1033	0.797 1311	0.793 0414	715	0.345 8222	0.344 0478	80
25	0.540 3811	0.547 5012	1029	0.788 8961	0.784 6954	734	0.342 2492	0.340 4267	69
26	−0.554 5825	−0.561 6247	+1025	+0.780 4396	+0.776 1290	+ 752	+0.338 5804	+0.336 7103	− 58
27	0.568 6272	0.575 5897	1020	0.771 7639	0.767 3445	771	0.334 8166	0.332 8994	46
28	0.582 5117	0.589 3927	1015	0.762 8711	0.758 3442	790	0.330 9587	0.328 9948	35
29	0.596 2322	0.603 0298	1010	0.753 7640	0.749 1307	808	0.327 0079	0.324 9980	23
30	0.609 7849	0.616 4972	1004	0.744 4447	0.739 7061	827	0.322 9653	0.320 9098	− 11
31	−0.623 1661	−0.629 7913	+ 997	+0.734 9154	+0.730 0728	+ 845	+0.318 8317	+0.316 7311	+ 1
Aug. 1	0.636 3723	0.642 9086	990	0.725 1786	0.720 2333	864	0.314 6082	0.312 4630	13
2	0.649 3998	0.655 8454	982	0.715 2370	0.710 1900	882	0.310 2958	0.308 1066	25
3	0.662 2448	0.668 5976	974	0.705 0927	0.699 9454	900	0.305 8956	0.303 6629	37
4	0.674 9035	0.681 1620	966	0.694 7484	0.689 5021	918	0.301 4086	0.299 1329	49
5	−0.687 3725	−0.693 5346	+ 957	+0.684 2067	+0.678 8626	+ 936	+0.296 8360	+0.294 5179	+ 61
6	0.699 6478	0.705 7118	947	0.673 4701	0.668 0296	953	0.292 1787	0.289 8187	73
7	0.711 7260	0.717 6897	937	0.662 5413	0.657 0056	970	0.287 4379	0.285 0366	85
8	0.723 6026	0.729 4643	926	0.651 4230	0.645 7937	987	0.282 6148	0.280 1728	98
9	0.735 2742	0.741 0319	915	0.640 1182	0.634 3968	1004	0.277 7107	0.275 2286	110
10	−0.746 7370	−0.752 3888	+ 903	+0.628 6300	+0.622 8181	+1020	+0.272 7268	+0.270 2054	+122
11	0.757 9869	0.763 5309	891	0.616 9615	0.611 0607	1037	0.267 6645	0.265 1044	134
12	0.769 0203	0.774 4547	879	0.605 1161	0.599 1281	1053	0.262 5252	0.259 9273	147
13	0.779 8337	0.785 1567	866	0.593 0973	0.587 0240	1069	0.257 3107	0.254 6756	159
14	0.790 4234	0.795 6334	852	0.580 9088	0.574 7521	1085	0.252 0223	0.249 3510	172
15	−0.800 7862	−0.805 8815	+ 838	+0.568 5545	+0.562 3163	+1101	+0.246 6619	+0.243 9552	+185
16	−0.810 9189	−0.815 8981	+ 823	+0.556 0381	+0.549 7204	+1116	+0.241 2312	+0.238 4900	+198

FOR GREENWICH MEAN NOON AND MIDNIGHT.

Date.	X True Equinox.		Reduc. to Mean Eq'x of Jan. 0.	Y True Equinox.		Reduc. to Mean Eq'x of Jan. 0.	Z True Equinox.		Reduc. to Mean Eq'x of Jan. 0.
	Noon.	*Midnight.*	*Noon.*	*Noon.*	*Midnight.*	*Noon.*	*Noon.*	*Midnight.*	*Noon.*
Aug. 16	−0.810 9189	−0.815 8981	+823	+0.556 0381	+0.549 7204	+1116	+0.241 2312	+0.238 4900	+198
17	0.820 8187	0.825 6803	809	0.543 3636	0.536 9681	1131	0.235 7318	0.232 9569	211
18	0.830 4826	0.835 2252	794	0.530 5345	0.524 0633	1146	0.230 1654	0.227 3577	224
19	0.839 9080	0.844 5306	779	0.517 5549	0.511 0100	1161	0.224 5339	0.221 6942	237
20	0.849 0927	0.853 5939	763	0.504 4289	0.497 8120	1176	0.218 8389	0.215 9680	249
21	−0.858 0340	−0.862 4126	+746	+0.491 1598	+0.484 4729	+1190	+0.213 0818	+0.210 1806	+262
22	0.866 7295	0.870 9844	729	0.477 7516	0.470 9965	1204	0.207 2646	0.204 3339	274
23	0.875 1771	0.879 3072	712	0.464 2080	0.457 3865	1218	0.201 3888	0.198 4294	287
24	0.883 3743	0.887 3782	694	0.450 5325	0.443 6467	1231	0.195 4559	0.192 4687	299
25	0.891 3187	0.895 1955	676	0.436 7294	0.429 7810	1244	0.189 4678	0.186 4534	312
26	−0.899 0084	−0.902 7571	+657	+0.422 8019	+0.415 7927	+1257	+0.183 4257	+0.180 3851	+324
27	0.906 4413	0.910 0608	638	0.408 7539	0.401 6860	1269	0.177 3317	0.174 2656	336
28	0.913 6152	0.917 1042	618	0.394 5893	0.387 4642	1281	0.171 1871	0.168 0963	348
29	0.920 5277	0.923 8855	598	0.380 3114	0.373 1314	1292	0.164 9934	0.161 8788	361
30	0.927 1772	0.930 4026	578	0.365 9245	0.358 6912	1303	0.158 7525	0.155 6148	373
31	−0.933 5614	−0.936 6534	+557	+0.351 4321	+0.344 1475	+1314	+0.152 4658	+0.149 3058	+385
Sept. 1	0.939 6782	0.942 6356	536	0.336 8380	0.329 5040	1324	0.146 1350	0.142 9536	397
2	0.945 5254	0.948 3473	515	0.322 1460	0.314 7646	1334	0.139 7617	0.136 5596	409
3	0.951 1011	0.953 7864	493	0.307 3602	0.299 9332	1344	0.133 3475	0.130 1256	421
4	0.956 4030	0.958 9509	471	0.292 4842	0.285 0138	1354	0.126 8941	0.123 6533	433
5	−0.961 4296	−0.963 8388	+449	+0.277 5225	+0.270 0107	+1363	+0.120 4034	+0.117 1446	+444
6	0.966 1783	0.968 4478	427	0.262 4790	0.254 9280	1371	0.113 8771	0.110 6012	456
7	0.970 6472	0.972 7763	404	0.247 3581	0.239 7700	1379	0.107 3170	0.104 0248	467
8	0.974 8347	0.976 8221	381	0.232 1642	0.224 5412	1387	0.100 7249	0.097 4175	479
9	0.978 7384	0.980 5834	357	0.216 9016	0.209 2461	1394	0.094 1030	0.090 7816	490
10	−0.982 3570	−0.984 0589	+333	+0.201 5754	+0.193 8898	+1401	+0.087 4534	+0.084 1187	+501
11	0.985 6889	0.987 2469	309	0.186 1900	0.178 4767	1408	0.080 7779	0.077 4312	512
12	0.988 7328	0.990 1465	284	0.170 7504	0.163 0118	1414	0.074 0788	0.070 7210	523
13	0.991 4877	0.992 7563	259	0.155 2613	0.147 4997	1420	0.067 3582	0.063 9906	534
14	0.993 9523	0.995 0757	234	0.139 7276	0.131 9456	1425	0.060 6184	0.057 2419	545
15	−0.996 1264	−0.997 1044	+208	+0.124 1543	+0.116 3541	+1430	+0.053 8613	+0.050 4770	+555
16	0.998 0095	0.998 8415	183	0.108 5457	0.100 7297	1435	0.047 0891	0.043 6980	566
17	0.999 6005	1.000 2864	157	0.092 9067	0.085 0773	1439	0.040 3039	0.036 9071	576
18	1.000 8993	1.001 4393	131	0.077 2422	0.069 4017	1443	0.033 5077	0.030 1061	586
19	1.001 9062	1.002 2999	105	0.061 5564	0.053 7070	1446	0.026 7024	0.023 2969	596
20	−1.002 6204	−1.002 8677	+ 79	+0.045 8539	+0.037 9978	+1449	+0.019 8899	+0.016 4817	+606
21	1.003 0418	1.003 1426	52	0.030 1392	0.022 2786	1452	0.013 0725	0.009 6624	615
22	1.003 1703	1.003 1248	+ 25	+0.014 4168	+0.006 5542	1454	+0.006 2517	+0.002 8407	625
23	1.003 0061	1.002 8142	− 2	−0.001 3088	−0.009 1717	1455	−0.000 5703	−0.003 9812	634
24	1.002 5490	1.002 2105	29	0.017 0337	0.024 8942	1456	0.007 3918	0.010 8018	643
25	−1.001 7987	−1.001 3137	− 57	−0.032 7528	−0.040 6089	+1457	−0.014 2109	−0.017 6190	+652
26	1.000 7556	1.000 1244	84	0.048 4621	0.056 3118	1457	0.021 0257	0.024 4308	661
27	0.999 4200	0.998 6424	112	0.064 1574	0.071 9984	1457	0.027 8342	0.031 2356	669
28	0.997 7916	0.996 8678	140	0.079 8342	0.087 6642	1457	0.034 6347	0.038 0314	677
29	0.995 8709	0.994 8009	168	0.095 4880	0.103 3050	1456	0.041 4253	0.044 8163	685
30	−0.993 6578	−0.992 4418	−196	−0.111 1147	−0.118 9165	+1454	−0.048 2042	−0.051 5887	+693
Oct. 1	−0.991 1527	−0.989 7906	−224	−0.126 7098	−0.134 4941	+1452	−0.054 9696	−0.058 3466	+701

FOR GREENWICH MEAN NOON AND MIDNIGHT.

Date.	X True Equinox.		Reduc. to Mean Eq'x of Jan. o.	Y True Equinox.		Reduc. to Mean Eq'x of Jan. o.	Z True Equinox.		Reduc. to Mean Eq'x of Jan. o.
	Noon.	*Midnight.*	*Noon.*	*Noon.*	*Midnight.*	*Noon.*	*Noon.*	*Midnight.*	*Noon.*
Oct. 1	-0.991 1527	-0.989 7906	- 224	-0.126 7098	-0.134 4941	+1452	-0.054 9696	-0.058 3466	+701
2	0.988 3555	0.986 8473	252	0.142 2688	0.150 0335	1450	0.061 7195	0.065 0881	708
3	0.985 2662	0.983 6123	281	0.157 7874	0.165 5299	1447	0.068 4520	0.071 8111	715
4	0.981 8856	0.980 0861	309	0.173 2606	0.180 9790	1443	0.075 1650	0.078 5136	722
5	0.978 2138	0.976 2687	338	0.188 6843	0.196 3759	1439	0.081 8565	0.085 1936	729
6	-0.974 2509	-0.972 1605	- 367	-0.204 0533	-0.211 7157	+1435	-0.088 5245	-0.091 8490	+735
7	0.969 9977	0.967 7626	396	0.219 3627	0.226 9937	1431	0.095 1669	0.098 4778	741
8	0.965 4552	0.963 0757	425	0.234 6079	0.242 2047	1426	0.101 7815	0.105 0777	747
9	0.960 6242	0.958 1009	454	0.249 7836	0.257 3439	1421	0.108 3661	0.111 6465	753
10	0.955 5059	0.952 8395	483	0.264 8851	0.272 4064	1416	0.114 9185	0.118 1819	758
11	-0.950 1018	-0.947 2928	- 513	-0.279 9073	-0.287 3872	+1410	-0.121 4365	-0.124 6819	+763
12	0.944 4128	0.941 4621	542	0.294 8454	0.302 2815	1403	0.127 9179	0.131 1444	768
13	0.938 4409	0.935 3496	571	0.309 6948	0.317 0846	1396	0.134 3609	0.137 5671	773
14	0.932 1883	0.928 9574	600	0.324 4505	0.331 7918	1388	0.140 7628	0.143 9479	778
15	0.925 6570	0.922 2874	630	0.339 1079	0.346 3983	1380	0.147 1221	0.150 2851	782
16	-0.918 8488	-0.915 3416	- 660	-0.353 6625	-0.360 9000	+1372	-0.153 4367	-0.156 5767	+786
17	0.911 7659	0.908 1221	689	0.368 1101	0.375 2924	1363	0.159 7048	0.162 8207	790
18	0.904 4105	0.900 6313	718	0.382 4464	0.389 5715	1354	0.165 9243	0.169 0153	793
19	0.896 7848	0.892 8714	747	0.396 6671	0.403 7325	1344	0.172 0934	0.175 1584	796
20	0.888 8913	0.884 8448	777	0.410 7673	0.417 7712	1334	0.178 2102	0.181 2486	799
21	-0.880 7321	-0.876 5536	- 806	-0.424 7436	-0.431 6840	+1323	-0.184 2733	-0.187 2840	+802
22	0.872 3096	0.868 0005	835	0.438 5919	0.445 4668	1312	0.190 2805	0.193 2628	804
23	0.863 6265	0.859 1879	864	0.452 3081	0.459 1154	1300	0.196 2305	0.199 1834	806
24	0.854 6850	0.850 1182	893	0.465 8881	0.472 6258	1288	0.202 1214	0.205 0441	808
25	0.845 4877	0.840 7938	922	0.479 3280	0.485 9943	1275	0.207 9514	0.210 8432	809
26	-0.836 0368	-0.831 2171	- 951	-0.492 6242	-0.499 2173	+1262	-0.213 7192	-0.216 5792	+810
27	0.826 3351	0.821 3910	980	0.505 7729	0.512 2906	1249	0.219 4230	0.222 2504	811
28	0.816 3851	0.811 3177	1009	0.518 7698	0.525 2102	1235	0.225 0611	0.227 8550	812
29	0.806 1891	0.800 9997	1038	0.531 6113	0.537 9727	1221	0.230 6318	0.233 3913	812
30	0.795 7497	0.790 4395	1067	0.544 2938	0.550 5741	1207	0.236 1335	0.238 8581	812
31	-0.785 0694	-0.779 6397	-1096	-0.556 8130	-0.563 0101	+1192	-0.241 5648	-0.244 2534	+811
Nov. 1	0.774 1508	0.768 6029	1125	0.569 1650	0.575 2772	1177	0.246 9237	0.249 5755	810
2	0.762 9966	0.757 3322	1153	0.581 3460	0.587 3709	1161	0.252 2086	0.254 8227	809
3	0.751 6100	0.745 8303	1182	0.593 3515	0.599 2874	1145	0.257 4175	0.259 9929	808
4	0.739 9936	0.734 1004	1210	0.605 1779	0.611 0226	1129	0.262 5487	0.265 0846	806
5	-0.728 1510	-0.722 1458	-1238	-0.616 8209	-0.622 5722	+1112	-0.267 6005	-0.270 0960	+804
6	0.716 0852	0.709 9697	1266	0.628 2762	0.633 9326	1094	0.272 5709	0.275 0252	802
7	0.703 7997	0.697 5758	1294	0.639 5407	0.645 0999	1077	0.277 4586	0.279 8707	800
8	0.691 2984	0.684 9680	1322	0.650 6097	0.656 0697	1059	0.282 2613	0.284 6304	797
9	0.678 5851	0.672 1503	1349	0.661 4795	0.666 8386	1040	0.286 9776	0.289 3028	794
10	-0.665 6640	-0.659 1267	-1376	-0.672 1465	-0.677 4028	+1021	-0.291 6058	-0.293 8863	+790
11	0.652 5390	0.645 9015	1403	0.682 6071	0.687 7589	1001	0.296 1442	0.298 3794	786
12	0.639 2146	0.632 4788	1430	0.692 8579	0.697 9037	981	0.300 5916	0.302 7807	782
13	0.625 6948	0.618 8630	1457	0.702 8958	0.707 8338	960	0.304 9465	0.307 0887	777
14	0.611 9841	0.605 0586	1483	0.712 7174	0.717 5462	939	0.309 2073	0.311 3021	772
15	-0.598 0870	-0.591 0698	-1510	-0.722 3198	-0.727 0378	+ 918	-0.313 3729	-0.315 4196	+767
16	-0.584 0076	-0.576 9009	-1536	-0.731 7000	-0.736 3059	+ 896	-0.317 4420	-0.319 4399	+762

FOR GREENWICH MEAN NOON AND MIDNIGHT.

Date.	X True Equinox.		Reduc. to Mean Eq'x of Jan. o.	Y True Equinox.		Reduc. to Mean Eq'x of Jan. o.	Z True Equinox.		Reduc. to Mean Eq'x of Jan. o.
	Noon.	*Midnight.*	*Noon.*	*Noon.*	*Midnight.*	*Noon.*	*Noon.*	*Midnight.*	*Noon.*
Nov. 16	−0.584 0076	−0.576 9009	−1536	−0.731 7000	−0.736 3059	+896	−0.317 4420	−0.319 4399	+762
17	0.569 7503	0.562 5564	1562	0.740 8552	0.745 3476	873	0.321 4133	0.323 3620	756
18	0.555 3198	0.548 0409	1588	0.749 7828	0.754 1604	850	0.325 2858	0.327 1846	750
19	0.540 7203	0.533 3586	1613	0.758 4800	0.762 7415	827	0.329 0583	0.330 9066	743
20	0.525 9564	0.518 5142	1638	0.766 9444	0.771 0884	803	0.332 7296	0.334 5271	736
21	−0.511 0325	−0.503 5118	−1663	−0.775 1732	−0.779 1986	+778	−0.336 2989	−0.338 0450	+729
22	0.495 9528	0.488 3561	1687	0.783 1642	0.787 0699	753	0.339 7651	0.341 4592	722
23	0.480 7222	0.473 0516	1711	0.790 9153	0.794 7001	728	0.343 1272	0.344 7689	714
24	0.465 3448	0.457 6024	1735	0.798 4241	0.802 0870	703	0.346 3842	0.347 9730	706
25	0.449 8249	0.442 0129	1759	0.805 6886	0.809 2284	677	0.349 5352	0.351 0708	698
26	−0.434 1670	−0.426 2876	−1782	−0.812 7063	−0.816 1219	+651	−0.352 5795	−0.354 0612	+689
27	0.418 3754	0.410 4308	1805	0.819 4751	0.822 7656	625	0.355 5159	0.356 9434	680
28	0.402 4544	0.394 4467	1827	0.825 9930	0.829 1569	598	0.358 3436	0.359 7163	671
29	0.386 4084	0.378 3399	1849	0.832 2571	0.835 2933	570	0.361 0614	0.362 3788	661
30	0.370 2419	0.362 1150	1870	0.838 2653	0.841 1731	542	0.363 6684	0.364 9301	651
ec. 1	−0.353 9597	−0.345 7767	−1891	−0.844 0161	−0.846 7939	+514	−0.366 1638	−0.367 3692	+641
2	0.337 5665	0.329 3298	1912	0.849 5063	0.852 1532	486	0.368 5462	0.369 6949	631
3	0.321 0672	0.312 7794	1932	0.854 7343	0.857 2492	457	0.370 8150	0.371 9064	621
4	0.304 4670	0.296 1306	1952	0.859 6978	0.862 0797	427	0.372 9689	0.374 0026	610
5	0.287 7709	0.279 3887	1971	0.864 3947	0.866 6426	397	0.375 0073	0.375 9829	599
6	−0.270 9845	−0.262 5590	−1990	−0.868 8233	−0.870 9365	+367	−0.376 9292	−0.377 8462	+587
7	0.254 1130	0.245 6470	2008	0.872 9820	0.874 9596	336	0.378 7338	0.379 5919	575
8	0.237 1619	0.228 6583	2026	0.876 8690	0.878 7102	305	0.380 4204	0.381 2193	563
9	0.220 1369	0.211 5985	2044	0.880 4829	0.882 1870	273	0.381 9885	0.382 7279	551
10	0.203 0438	0.194 4734	2061	0.883 8224	0.885 3890	241	0.383 4374	0.384 1170	538
11	−0.185 8880	−0.177 2881	−2077	−0.886 8866	−0.888 3152	+208	−0.384 7667	−0.385 3864	+525
12	0.168 6746	0.160 0484	2093	0.889 6747	0.890 9648	175	0.385 9761	0.386 5356	512
13	0.151 4100	0.142 7600	2108	0.892 1854	0.893 3366	142	0.387 0649	0.387 5641	499
14	0.134 0993	0.125 4285	2123	0.894 4183	0.895 4304	108	0.388 0332	0.388 4720	485
15	0.116 7483	0.108 0594	2137	0.896 3729	0.897 2456	74	0.388 8806	0.389 2590	471
16	−0.099 3624	−0.090 6581	−2150	−0.898 0486	−0.898 7818	+ 40	−0.389 6071	−0.389 9248	+457
17	0.081 9472	0.073 2302	2163	0.899 4451	0.900 0386	+ 5	0.390 2122	0.390 4695	443
18	0.064 5079	0.055 7810	2176	0.900 5622	0.901 0160	− 30	0.390 6963	0.390 8928	428
19	0.047 0501	0.038 3160	2188	0.901 3998	0.901 7137	65	0.391 0590	0.391 1948	413
20	0.029 5792	0.020 8404	2199	0.901 9577	0.902 1319	100	0.391 3004	0.391 3757	398
21	−0.012 1003	−0.003 3595	−2209	−0.902 2362	−0.902 2706	−136	−0.391 4207	−0.391 4354	+383
22	+0.005 3813	+0.014 1215	2218	0.902 2351	0.902 1299	172	0.391 4199	0.391 3741	367
23	0.022 8607	0.031 5980	2227	0.901 9549	0.901 7102	208	0.391 2980	0.391 1918	351
24	0.040 3329	0.049 0645	2235	0.901 3957	0.901 0115	245	0.391 0554	0.390 8888	335
25	0.057 7924	0.066 5161	2243	0.900 5575	0.900 0339	282	0.390 6919	0.390 4648	318
26	+0.075 2348	+0.083 9479	−2250	−0.899 4406	−0.898 7776	−319	−0.390 2076	−0.389 9202	+301
27	0.092 6548	0.101 3548	2256	0.898 0449	0.897 2427	356	0.389 6026	0.389 2548	285
28	0.110 0474	0.118 7318	2261	0.896 3709	0.895 4294	394	0.388 8768	0.388 4686	268
29	0.127 4074	0.136 0735	2266	0.894 4183	0.893 3377	432	0.388 0303	0.387 5619	251
30	0.144 7295	0.153 3746	2270	0.892 1876	0.890 9680	470	0.387 0633	0.386 5346	234
31	+0.162 0081	+0.170 6294	−2272	−0.889 6791	−0.888 3208	−508	−0.385 9757	−0.385 3868	+216
32	+0.179 2378	+0.187 8326	−2273	−0.886 8932	−0.885 3963	−546	−0.384 7678	−0.384 1188	+198

MOON'S LONGITUDE AND LATITUDE, 1912.

FOR GREENWICH MEAN NOON AND MIDNIGHT

Day of Month.	JANUARY.		Day of Month.	FEBRUARY.		Day of Month.	MARCH.	
	True Long.	Latitude.		True Long.	Latitude.		True Long.	Latitude.
	° ′ ″	° ′ ″		° ′ ″	° ′ ″		° ′ ″	° ′ ″
1.0	56 40 16.5	+2 24 38.3	1.0	109 58 13.2	+5 0 3.9	1.0	133 47 32.6	+4 47 12.8
1.5	63 59 39.6	2 57 19.6	1.5	117 35 29.4	5 0 37.3	1.5	141 13 10.4	4 30 12.5
2.0	71 25 27.9	3 27 27.3	2.0	125 13 6.7	4 55 49.6	2.0	148 37 29.9	4 8 41.8
2.5	78 56 53.5	3 54 19.9	2.5	132 49 39.7	4 45 47.0	2.5	155 59 28.0	3 43 7.8
3.0	86 32 54.3	4 17 18.6	3.0	140 23 44.3	4 30 44.9	3.0	163 18 5.1	3 14 3.1
3.5	94 12 16.1	+4 35 49.2	3.5	147 54 2.1	+4 11 7.3	3.5	170 32 27.8	+2 42 4.6
4.0	101 53 34.0	4 49 24.0	4.0	155 19 24.1	3 47 24.6	4.0	177 41 50.4	2 7 51.4
4.5	109 35 17.9	4 57 43.9	4.5	162 38 52.7	3 20 11.9	4.5	184 45 36.4	1 32 3.7
5.0	117 15 55.8	5 0 39.4	5.0	169 51 43.6	2 50 7.3	5.0	191 43 19.1	0 55 21.0
5.5	124 53 58.2	4 58 11.0	5.5	176 57 26.2	2 17 50.1	5.5	198 34 41.9	+0 18 20.5
6.0	132 28 2.7	+4 50 28.6	6.0	183 55 43.7	+1 43 58.8	6.0	205 19 38.0	−0 18 23.1
6.5	139 56 57.7	4 37 50.3	6.5	190 46 31.9	1 9 10.1	6.5	211 58 9.5	0 54 18.7
7.0	147 19 44.8	4 20 41.5	7.0	197 29 57.8	+0 33 58.0	7.0	218 30 26.7	1 28 59.0
7.5	154 35 40.1	3 59 32.4	7.5	204 6 17.9	−0 1 6.8	7.5	224 56 47.1	2 2 0.5
8.0	161 44 14.7	3 34 56.3	8.0	210 35 56.0	0 35 36.8	8.0	231 17 33.8	2 33 3.5
8.5	168 45 14.2	+3 7 28.0	8.5	216 59 22.3	−1 9 8.0	8.5	237 33 14.5	−3 1 51.2
9.0	175 38 37.3	2 37 42.2	9.0	223 17 11.1	1 41 19.6	9.0	243 44 20.7	3 28 9.8
9.5	182 24 33.8	2 6 12.5	9.5	229 29 59.3	2 11 53.3	9.5	249 51 26.4	3 51 47.9
10.0	189 3 22.7	1 33 30.7	10.0	235 38 25.4	2 40 33.1	10.0	255 55 7.4	4 12 36.4
10.5	195 35 30.1	1 0 6.4	10.5	241 43 8.5	3 7 5.3	10.5	261 56 0.3	4 30 27.6
11.0	202 1 27.3	+0 26 26.8	11.0	247 44 47.4	−3 31 17.9	11.0	267 54 41.9	−4 45 15.3
11.5	208 21 49.0	−0 7 3.4	11.5	253 43 59.6	3 53 0.1	11.5	273 51 48.8	4 56 54.2
12.0	214 37 11.8	0 40 1.7	12.0	259 41 21.0	4 12 2.5	12.0	279 47 56.9	5 5 20.0
12.5	220 48 13.1	1 12 7.6	12.5	265 37 25.3	4 28 16.5	12.5	285 43 40.3	5 10 29.3
13.0	226 55 29.9	1 43 2.5	13.0	271 32 43.9	4 41 34.6	13.0	291 39 31.4	5 12 19.6
13.5	232 59 37.8	−2 12 29.2	13.5	277 27 45.4	−4 51 50.1	13.5	297 36 1.0	−5 10 49.1
14.0	239 1 10.8	2 40 12.2	14.0	283 22 55.2	4 58 57.3	14.0	303 33 37.2	5 5 56.8
14.5	245 0 40.3	3 5 57.0	14.5	289 18 36.2	5 2 51.5	14.5	309 32 45.5	4 57 43.2
15.0	250 58 35.1	3 29 30.3	15.0	295 15 8.1	5 3 29.4	15.0	315 33 48.6	4 46 9.9
15.5	256 55 21.0	3 50 39.8	15.5	301 12 47.6	5 0 48.7	15.5	321 37 6.7	4 31 20.1
16.0	262 51 21.0	−4 9 14.4	16.0	307 11 48.7	−4 54 48.8	16.0	327 42 56.5	−4 13 19.1
16.5	268 46 55.1	4 25 3.9	16.5	313 12 23.3	4 45 30.8	16.5	333 51 31.8	3 52 14.1
17.0	274 42 20.3	4 37 59.5	17.0	319 14 41.1	4 32 57.7	17.0	340 3 3.8	3 28 14.6
17.5	280 37 51.3	4 47 53.6	17.5	325 18 50.2	4 17 14.4	17.5	346 17 40.9	3 1 32.9
18.0	286 33 40.7	4 54 40.1	18.0	331 24 57.4	3 58 28.1	18.0	352 35 28.9	2 32 23.9
18.5	292 29 59.1	−4 58 14.3	18.5	337 33 8.9	−3 36 48.0	18.5	358 56 31.2	−2 1 5.2
19.0	298 26 55.7	4 58 33.0	19.0	343 43 30.6	3 12 25.8	19.0	5 20 49.5	1 27 57.3
19.5	304 24 39.0	4 55 34.9	19.5	349 56 8.8	2 45 35.2	19.5	11 48 23.9	0 53 23.2
20.0	310 23 17.2	4 49 20.5	20.0	356 11 10.5	2 16 32.2	20.0	18 19 13.2	−0 17 48.4
20.5	316 22 59.1	4 39 52.2	20.5	2 28 43.8	1 45 35.1	20.5	24 53 15.4	+0 18 19.6
21.0	322 23 53.8	−4 27 13.8	21.0	8 48 58.4	−1 13 3.8	21.0	31 30 27.9	+0 54 31.6
21.5	328 26 12.0	4 11 31.1	21.5	15 12 5.5	0 39 20.2	21.5	38 10 47.9	1 30 17.0
22.0	334 30 6.2	3 52 51.8	22.0	21 38 17.8	−0 4 47.9	22.0	44 54 12.4	2 5 4.7
22.5	340 35 51.0	3 31 25.4	22.5	28 7 49.6	+0 30 8.1	22.5	51 40 38.4	2 38 23.3
23.0	346 43 43.3	3 7 22.9	23.0	34 40 56.4	1 5 1.3	23.0	58 30 2.6	3 9 41.7
23.5	352 54 2.7	−2 40 57.0	23.5	41 17 54.1	+1 39 23.9	23.5	65 22 21.3	+3 38 29.8
24.0	359 7 11.1	2 12 22.0	24.0	47 58 58.6	2 12 47.1	24.0	72 17 30.3	4 4 18.9
24.5	5 23 33.2	1 41 54.2	24.5	54 44 24.7	2 44 41.5	24.5	79 15 24.2	4 26 42.3
25.0	11 43 35.6	1 9 51.4	25.0	61 34 25.2	3 14 37.0	25.0	86 15 55.9	4 45 15.8
25.5	18 7 46.0	0 36 33.4	25.5	68 29 9.4	3 42 3.2	25.5	93 18 56.2	4 59 38.3
26.0	24 36 33.1	−0 2 22.1	26.0	75 28 42.2	+4 6 30.2	26.0	100 24 13.4	+5 9 32.4
26.5	31 10 25.6	+0 32 18.5	26.5	82 33 2.3	4 27 29.0	26.5	107 31 32.6	5 14 44.7
27.0	37 49 50.6	1 7 2.1	27.0	89 42 1.1	4 44 32.5	27.0	114 40 35.2	5 15 6.3
27.5	44 35 12.2	1 41 20.2	27.5	96 55 22.2	4 57 16.3	27.5	121 50 59.2	5 10 33.8
28.0	51 26 50.4	2 14 41.9	28.0	104 12 39.9	5 5 19.7	28.0	129 2 18.8	5 1 9.1
28.5	58 24 58.9	+2 46 34.3	28.5	111 33 19.3	+5 8 27.1	28.5	136 14 4.5	+4 46 59.7
29.0	65 29 43.3	3 16 22.6	29.0	118 56 36.8	5 6 28.9	29.0	143 25 43.9	4 28 19.2
29.5	72 40 59.3	3 43 31.3	29.5	126 21 40.6	4 59 22.5	29.5	150 36 42.2	4 5 26.8
30.0	79 58 30.7	4 7 25.0	30.0	133 47 32.6	4 47 12.8	30.0	157 46 23.2	3 38 46.8
30.5	87 21 48.5	4 27 29.6	30.5	141 13 10.4	4 30 12.5	30.5	164 54 10.1	3 8 48.5
31.0	*94 50 10.5*	*+4 43 14.1*	31.0	148 37 29.9	+4 8 41.8	31.0	171 59 26.8	+2 36 4.7
31.5	*102 22 41.2*	*+4 54 12.2*	31.5	155 59 28.0	+3 43 7.8	31.5	179 1 39.2	+2 1 11.0

MOON'S LONGITUDE AND LATITUDE, 1912.

FOR GREENWICH MEAN NOON AND MIDNIGHT.

Day of Month.	APRIL.		Day of Month.	MAY.		Day of Month.	JUNE.	
	True Long.	Latitude.		True Long.	Latitude.		True Long.	Latitude.
	° ′ ″	° ′ ″		° ′ ″	° ′ ″		° ′ ″	° ′ ″
1.0	186 0 16.2	+1 24 44.7	1.0	221 34 16.5	−1 48 3.9	1.0	267 49 41.2	−4 42 36.5
1.5	192 54 50.4	0 47 23.4	1.5	228 2 11.8	2 20 42.7	1.5	273 53 40.1	4 53 22.0
2.0	199 44 59.2	+0 9 43.8	2.0	234 26 28.0	2 51 14.7	2.0	279 55 37.5	5 0 46.4
2.5	206 30 25.2	−0 27 39.0	2.5	240 47 5.9	3 19 20.3	2.5	285 55 46.1	5 4 48.5
3.0	213 10 56.8	1 4 12.3	3.0	247 4 9.3	3 44 43.3	3.0	291 54 21.1	5 5 28.8
3.5	219 46 27.9	−1 39 26.8	3.5	253 17 45.5	−4 7 10.4	3.5	297 51 40.5	−5 2 49.4
4.0	226 16 58.4	2 12 56.6	4.0	259 28 4.8	4 26 31.2	4.0	303 48 5.1	4 56 53.9
4.5	232 42 34.0	2 44 19.5	4.5	265 35 20.7	4 42 38.0	4.5	309 43 58.6	4 47 46.8
5.0	239 3 25.2	3 13 16.8	5.0	271 39 49.9	4 55 25.5	5.0	315 39 47.5	4 35 33.7
5.5	245 19 47.3	3 39 33.1	5.5	277 41 52.3	5 4 50.3	5.5	321 36 1.2	4 20 21.2
6.0	251 32 0.3	−4 2 56.3	6.0	283 41 51.0	−5 10 50.9	6.0	327 33 11.2	−4 2 16.7
6.5	257 40 27.7	4 23 16.9	6.5	289 40 11.8	5 13 27.0	6.5	333 31 51.3	3 41 28.6
7.0	263 45 36.2	4 40 27.6	7.0	295 37 22.9	5 12 39.8	7.0	339 32 37.1	3 18 6.0
7.5	269 47 55.2	4 54 23.2	7.5	301 33 54.7	5 8 31.3	7.5	345 36 5.6	2 52 19.3
8.0	275 47 56.5	5 5 0.0	8.0	307 30 19.8	5 1 4.6	8.0	351 42 54.5	2 24 20.3
8.5	281 46 13.1	−5 12 15.4	8.5	313 27 12.1	−4 50 23.5	8.5	357 53 41.6	−1 54 22.2
9.0	287 43 19.2	5 16 8.1	9.0	319 25 6.5	4 36 32.3	9.0	4 9 3.9	1 22 40.3
9.5	293 39 49.5	5 16 37.6	9.5	325 24 38.8	4 19 36.6	9.5	10 29 36.8	0 49 32.0
10.0	299 36 19.1	5 13 44.1	10.0	331 26 24.9	3 59 42.8	10.0	16 55 53.1	−0 15 17.4
10.5	305 33 23.0	5 7 28.7	10.5	337 31 0.5	3 36 58.5	10.5	23 28 21.4	+0 19 40.4
11.0	311 31 35.0	−4 57 53.1	11.0	343 39 0.1	−3 11 32.9	11.0	30 7 24.9	+0 54 55.3
11.5	317 31 27.8	4 45 0.2	11.5	349 50 56.8	2 43 36.9	11.5	36 53 19.8	1 29 58.0
12.0	323 33 32.7	4 28 53.8	12.0	356 7 21.1	2 13 23.8	12.0	43 46 13.8	2 4 15.9
12.5	329 38 18.9	4 9 39.4	12.5	2 28 40.3	1 41 9.4	12.5	50 46 5.0	2 37 14.3
13.0	335 46 12.9	3 47 24.0	13.0	8 55 17.7	1 7 12.4	13.0	57 52 40.2	3 8 16.0
13.5	341 57 38.6	−3 22 16.8	13.5	15 27 31.4	−0 31 54.6	13.5	65 5 34.1	+3 36 42.8
14.0	348 12 56.4	2 54 29.2	14.0	22 5 33.9	+0 4 18.6	14.0	72 24 9.7	4 1 57.7
14.5	354 32 22.8	2 24 15.5	14.5	28 49 30.6	0 40 58.4	14.5	79 47 38.3	4 23 25.5
15.0	0 56 10.5	1 51 52.8	15.0	35 39 19.3	1 17 32.8	15.0	87 15 0.7	4 40 34.9
15.5	7 24 27.5	1 17 41.5	15.5	42 34 49.7	1 53 27.0	15.5	94 45 9.4	4 53 0.5
16.0	13 57 17.3	−0 42 5.2	16.0	49 35 43.2	+2 28 4.2	16.0	102 16 51.4	+5 0 23.8
16.5	20 34 38.8	−0 5 30.7	16.5	56 41 32.7	3 0 46.4	16.5	109 48 51.5	5 2 34.5
17.0	27 16 26.3	+0 31 32.4	17.0	63 51 43.2	3 30 56.0	17.0	117 19 55.6	4 59 31.0
17.5	34 2 29.3	1 8 31.9	17.5	71 5 32.9	3 57 56.9	17.5	124 48 54.1	4 51 19.9
18.0	40 52 33.0	1 44 53.6	18.0	78 22 14.1	4 21 16.1	18.0	132 14 44.9	4 38 15.8
18.5	47 46 19.0	+2 20 2.5	18.5	85 40 55.2	+4 40 25.0	18.5	139 36 35.1	+4 20 40.2
19.0	54 43 25.6	2 53 23.3	19.0	93 0 42.8	4 55 0.4	19.0	146 53 42.8	3 58 59.6
19.5	61 43 28.2	3 24 21.5	19.5	100 20 43.7	5 4 45.6	19.5	154 5 37.5	3 33 44.6
20.0	68 46 0.4	3 52 24.3	20.0	107 40 6.7	5 9 31.1	20.0	161 11 59.8	3 5 28.2
20.5	75 50 34.6	4 17 1.8	20.5	114 58 4.8	5 9 14.1	20.5	168 12 40.6	2 34 44.4
21.0	82 56 42.9	+4 37 47.6	21.0	122 13 56.5	+5 3 58.8	21.0	175 7 39.7	+2 2 7.3
21.5	90 3 57.7	4 54 19.5	21.5	129 27 6.8	4 53 55.5	21.5	181 57 4.6	1 28 10.2
22.0	97 11 52.2	5 6 20.2	22.0	136 37 7.8	4 39 19.9	22.0	188 41 8.3	0 53 25.2
22.5	104 20 1.1	5 13 37.6	22.5	143 43 38.6	4 20 32.5	22.5	195 20 8.3	+0 18 22.7
23.0	111 28 0.7	5 16 4.7	23.0	150 46 25.2	3 57 57.1	23.0	201 54 24.8	−0 16 28.9
23.5	118 35 29.4	+5 13 40.0	23.5	157 45 19.8	+3 32 0.5	23.5	208 24 19.5	−0 50 43.2
24.0	125 42 7.5	5 6 27.3	24.0	164 40 19.6	3 3 11.5	24.0	214 50 14.8	1 23 56.0
24.5	132 47 37.0	4 54 35.3	24.5	171 31 26.2	2 32 0.1	24.5	221 12 32.4	1 55 44.8
25.0	139 51 41.7	4 38 17.4	25.0	178 18 44.3	1 58 56.8	25.0	227 31 32.8	2 25 49.2
25.5	146 54 7.0	4 17 51.4	25.5	185 2 20.8	1 24 32.5	25.5	233 47 35.2	2 53 51.0
26.0	153 54 39.4	+3 53 39.0	26.0	191 42 24.0	+0 49 17.8	26.0	240 0 56.8	−3 19 33.6
26.5	160 53 6.1	3 26 5.3	26.5	198 19 2.7	+0 13 42.5	26.5	246 11 52.7	3 42 42.6
27.0	167 49 15.0	2 55 38.5	27.0	204 52 25.3	−0 21 44.4	27.0	252 20 36.3	4 3 5.4
27.5	174 42 54.6	2 22 48.8	27.5	211 22 40.0	0 56 35.2	27.5	258 27 19.1	4 20 31.7
28.0	181 33 53.7	1 48 8.4	28.0	217 49 53.9	1 30 23.8	28.0	264 32 11.2	4 34 52.9
28.5	188 22 1.5	+1 12 10.4	28.5	224 14 13.2	−2 2 45.8	28.5	270 35 21.6	−4 46 2.4
29.0	195 7 7.6	+0 35 28.0	29.0	230 35 43.4	2 33 19.0	29.0	276 36 58.6	4 53 55.8
29.5	201 49 2.3	−0 1 25.6	29.5	236 54 29.0	3 1 43.2	29.5	282 37 10.5	4 58 30.8
30.0	208 27 36.8	0 37 58.6	30.0	243 10 34.2	3 27 40.7	30.0	288 36 6.2	4 59 46.7
30.5	215 2 43.5	1 13 40.7	30.5	249 24 3.0	3 50 56.2	30.5	294 33 55.0	4 57 44.7
31.0	221 34 16.5	−1 48 3.9	31.0	255 35 0.0	−4 11 17.0	31.0	300 30 48.0	−4 52 27.8
31.5	*228 2 11.8*	*−2 20 42.7*	*31.5*	261 43 30.6	−4 28 33.0	31.5	306 26 57.8	−4 44 0.4

MOON'S LONGITUDE AND LATITUDE, 1912.

FOR GREENWICH MEAN NOON AND MIDNIGHT.

Day of Month.	JULY.		Day of Month.	AUGUST.		Day of Month.	SEPTEMBER.	
	True Long.	Latitude.		True Long.	Latitude.		True Long.	Latitude.
	° ′ ″	° ′ ″		° ′ ″	° ′ ″		° ′ ″	° ′ ″
1.0	300 30 48.0	−4 52 27.8	1.0	345 5 17.6	−2 29 5.7	1.0	31 24 33.4	+1 40 17.3
1.5	306 26 57.8	4 44 0.4	1.5	351 5 47.3	2 0 31.5	1.5	37 47 22.4	2 12 38.1
2.0	312 22 39.2	4 32 28.5	2.0	357 8 10.7	1 30 24.7	2.0	44 14 16.6	2 43 39.2
2.5	318 18 9.3	4 17 59.3	2.5	3 12 53.6	0 59 2.3	2.5	50 45 37.4	3 12 54.8
3.0	324 13 48.0	4 0 41.4	3.0	9 20 24.0	−0 26 42.6	3.0	57 21 45.5	3 39 58.7
3.5	330 9 58.0	−3 40 44.1	3.5	15 31 11.9	+0 6 15.0	3.5	64 2 59.4	+4 4 24.5
4.0	336 7 4.8	3 18 17.8	4.0	21 45 48.7	0 39 29.9	4.0	70 49 34.7	4 25 45.8
4.5	342 5 36.6	2 53 34.1	4.5	28 4 46.8	1 12 40.0	4.5	77 41 42.6	4 43 37.0
5.0	348 6 4.3	2 26 45.5	5.0	34 28 38.6	1 45 21.8	5.0	84 39 29.2	4 57 33.7
5.5	354 9 1.1	1 58 5.5	5.5	40 57 55.7	2 17 10.2	5.5	91 42 53.7	5 7 13.4
6.0	0 15 2.2	−1 27 49.0	6.0	47 33 7.7	+2 47 38.5	6.0	98 51 47.2	+5 12 16.5
6.5	6 24 44.4	0 56 11.9	6.5	54 14 40.5	3 16 18.5	6.5	106 5 51.9	5 12 27.4
7.0	12 38 45.0	−0 23 31.9	7.0	61 2 55.1	3 42 40.8	7.0	113 24 40.5	5 7 35.7
7.5	18 57 41.4	+0 9 51.2	7.5	67 58 5.7	4 6 14.9	7.5	120 47 35.8	4 57 37.0
8.0	25 22 10.0	0 43 35.7	8.0	75 0 17.8	4 26 30.3	8.0	128 13 51.2	4 42 34.1
8.5	31 52 44.6	+1 17 17.6	8.5	82 9 26.3	+4 42 57.2	8.5	135 42 32.0	+4 22 37.6
9.0	38 29 55.4	1 50 30.3	9.0	89 25 14.5	4 55 7.7	9.0	143 12 36.6	3 58 6.2
9.5	45 14 7.3	2 22 44.7	9.5	96 47 12.8	5 2 37.0	9.5	150 42 59.1	3 29 26.5
10.0	52 5 37.8	2 53 29.3	10.0	104 14 38.3	5 5 5.5	10.0	158 12 32.0	2 57 12.0
10.5	59 4 35.3	3 22 10.6	10.5	111 46 35.2	5 2 20.2	10.5	165 40 8.4	2 22 2.0
11.0	66 10 57.1	+3 48 13.8	11.0	119 21 56.7	+4 54 15.6	11.0	173 4 44.9	+1 44 39.8
11.5	73 24 27.9	4 11 3.9	11.5	126 59 26.7	4 40 55.2	11.5	180 25 24.0	1 5 50.8
12.0	80 44 39.1	4 30 6.8	12.0	134 37 43.4	4 22 32.2	12.0	187 41 16.2	+0 26 20.5
12.5	88 10 47.9	4 44 51.3	12.5	142 15 23.4	3 59 28.5	12.5	194 51 41.0	−0 13 7.1
13.0	95 41 57.7	4 54 50.7	13.0	149 51 4.8	3 32 14.1	13.0	201 56 7.7	0 51 51.2
13.5	103 16 59.8	+4 59 44.7	13.5	157 23 31.1	+3 1 25.9	13.5	208 54 15.6	−1 29 15.2
14.0	110 54 36.2	4 59 20.8	14.0	164 51 34.4	2 27 45.5	14.0	215 45 54.1	2 4 47.3
14.5	118 33 22.6	4 53 35.6	14.5	172 14 18.0	1 51 56.8	14.5	222 31 1.5	2 38 0.8
15.0	126 11 52.3	4 42 35.2	15.0	179 30 57.5	1 14 44.3	15.0	229 9 44.3	3 8 34.0
15.5	133 48 40.6	4 26 34.9	15.5	186 41 1.2	+0 36 51.3	15.5	235 42 16.2	3 36 9.9
16.0	141 22 28.9	+4 5 58.3	16.0	193 44 9.9	−0 1 1.9	16.0	242 8 56.9	−4 0 35.6
16.5	148 52 7.5	3 41 15.9	16.5	200 40 16.3	0 38 18.4	16.5	248 30 10.7	4 21 42.0
17.0	156 16 38.4	3 13 3.4	17.0	207 29 23.4	1 14 25.9	17.0	254 46 25.7	4 39 22.9
17.5	163 35 16.9	2 41 59.4	17.5	214 11 43.0	1 48 56.4	17.5	260 58 12.6	4 53 34.6
18.0	170 47 31.6	2 8 43.9	18.0	220 47 33.9	2 21 26.4	18.0	267 6 4.0	5 4 15.4
18.5	177 53 4.2	+1 33 56.5	18.5	227 17 20.5	−2 51 36.3	18.5	273 10 33.5	−5 11 25.1
19.0	184 51 48.4	0 58 15.3	19.0	233 41 31.1	3 19 10.1	19.0	279 12 14.9	5 15 4.9
19.5	191 43 48.1	+0 22 15.6	19.5	240 0 36.4	3 43 55.0	19.5	285 11 41.8	5 15 17.1
20.0	198 29 15.8	−0 13 30.0	20.0	246 15 8.7	4 5 41.0	20.0	291 9 27.0	5 12 4.9
20.5	205 8 30.6	0 48 32.2	20.5	252 25 40.8	4 24 20.2	20.5	297 6 2.5	5 5 32.3
21.0	211 41 56.6	−1 22 25.2	21.0	258 32 45.3	−4 39 46.6	21.0	303 1 58.6	−4 55 44.1
21.5	218 10 1.0	1 54 46.2	21.5	264 36 54.0	4 51 56.0	21.5	308 57 43.8	4 42 46.3
22.0	224 33 12.8	2 25 15.2	22.0	270 38 37.0	5 0 45.6	22.0	314 53 44.7	4 26 45.8
22.5	230 52 1.8	2 53 35.0	22.5	276 38 22.6	5 6 13.8	22.5	320 50 26.1	4 7 50.6
23.0	237 6 57.6	3 19 30.6	23.0	282 36 37.3	5 8 20.1	23.0	326 48 10.4	3 46 10.3
23.5	243 18 28.6	−3 42 49.2	23.5	288 33 45.6	−5 7 5.5	23.5	332 47 18.0	−3 21 55.8
24.0	249 27 1.7	4 3 19.9	24.0	294 30 9.8	5 2 32.1	24.0	338 48 7.0	2 55 19.6
24.5	255 33 1.7	4 20 53.6	24.5	300 26 9.8	4 54 43.1	24.5	344 50 53.6	2 26 36.1
25.0	261 36 51.3	4 35 22.9	25.0	306 22 3.6	4 43 43.3	25.0	350 55 52.0	1 56 1.6
25.5	267 38 50.9	4 46 41.9	25.5	312 18 7.5	4 29 38.7	25.5	357 3 14.6	1 23 54.1
26.0	273 39 18.6	−4 54 46.3	26.0	318 14 36.4	−4 12 37.1	26.0	3 13 12.3	−0 50 33.4
26.5	279 38 30.4	4 59 33.4	26.5	324 11 43.9	3 52 47.7	26.5	9 25 54.4	−0 16 21.2
27.0	285 36 40.5	5 1 2.2	27.0	330 9 42.8	3 30 21.1	27.0	15 41 29.2	+0 18 19.2
27.5	291 34 1.7	4 59 13.1	27.5	336 8 45.1	3 5 29.9	27.5	22 0 3.9	0 53 3.3
28.0	297 30 45.5	4 54 8.4	28.0	342 9 3.0	2 38 28.2	28.0	28 21 44.9	1 27 25.3
28.5	303 27 2.8	−4 45 51.8	28.5	348 10 49.0	−2 9 31.2	28.5	34 46 38.3	+2 0 58.6
29.0	309 23 4.5	4 34 28.8	29.0	354 14 15.8	1 38 56.1	29.0	41 14 49.5	2 33 16.1
29.5	315 19 1.5	4 20 6.2	29.5	0 19 37.3	1 7 1.5	29.5	47 46 23.7	3 3 50.8
30.0	321 15 5.6	4 2 52.5	30.0	6 27 8.4	0 34 6.9	30.0	54 21 25.7	3 32 15.8
30.5	327 11 29.8	3 42 57.7	30.5	12 37 5.3	−0 0 33.3	30.5	61 0 0.0	3 58 4.8
31.0	333 8 28.6	−3 20 33.1	31.0	18 49 45.5	+0 33 17.4	31.0	67 42 10.5	+4 20 52.7
31.5	339 6 18.3	−2 55 51.2	31.5	25 5 28.1	+1 7 2.2	31.5	74 28 0.1	+4 40 15.9

FOR GREENWICH MEAN NOON AND MIDNIGHT.

Day of Month.	OCTOBER.		Day of Month.	NOVEMBER.		Day of Month.	DECEMBER.	
	True Long.	Latitude.		True Long.	Latitude.		True Long.	Latitude.
	° ′ ″	° ′ ″		° ′ ″	° ′ ″		° ′ ″	° ′ ″
1.0	67 42 10.5	+4 20 52.7	1.0	120 8 7.2	+4 58 25.3	1.0	159 27 0.4	+2 38 48.9
1.5	74 28 0.1	4 40 15.9	1.5	127 12 51.1	4 44 15.7	1.5	166 27 2.2	2 5 42.5
2.0	81 17 30.7	4 55 52.6	2.0	134 18 2.5	4 25 45.2	2.0	173 24 28.5	1 30 55.9
2.5	88 10 42.0	5 7 23.5	2.5	141 23 27.3	4 3 10.3	2.5	180 19 19.6	0 55 2.2
3.0	95 7 31.8	5 14 31.9	3.0	148 28 51.4	3 36 51.9	3.0	187 11 37.3	+0 18 34.7
3.5	102 7 54.9	+5 17 4.8	3.5	155 34 0.9	+3 7 15.0	3.5	194 1 23.6	−0 17 53.9
4.0	109 11 42.7	5 14 53.0	4.0	162 38 41.2	2 34 48.2	4.0	200 48 40.3	0 53 52.0
4.5	116 18 42.5	5 7 51.7	4.5	169 42 36.7	2 0 3.1	4.5	207 33 28.0	1 28 49.2
5.0	123 28 37.3	4 56 1.2	5.0	176 45 30.3	1 23 33.9	5.0	214 15 46.1	2 2 16.8
5.5	130 41 5.1	4 39 27.3	5.5	183 47 3.7	0 45 56.5	5.5	220 55 32.0	2 33 48.1
6.0	137 55 39.2	+4 18 21.9	6.0	190 46 57.2	+0 7 47.8	6.0	227 32 41.6	−3 2 59.4
6.5	145 11 48.0	3 53 2.7	6.5	197 44 49.9	−0 30 15.1	6.5	234 7 9.4	3 29 29.4
7.0	152 28 55.6	3 23 53.6	7.0	204 40 20.1	1 7 36.0	7.0	240 38 48.6	3 53 0.1
7.5	159 46 22.4	2 51 23.9	7.5	211 33 5.7	1 43 40.6	7.5	247 7 32.1	4 13 16.8
8.0	167 3 25.8	2 16 8.4	8.0	218 22 45.0	2 17 56.9	8.0	253 33 12.8	4 30 8.2
8.5	174 19 21.6	+1 38 45.5	8.5	225 8 57.8	−2 49 56.3	8.5	259 55 44.5	−4 43 26.5
9.0	181 33 25.3	0 59 56.3	9.0	231 51 25.8	3 19 14.1	9.0	266 15 2.6	4 53 7.1
9.5	188 44 53.7	+0 20 23.6	9.5	238 29 53.4	3 45 29.7	9.5	272 31 4.9	4 59 8.6
10.0	195 53 5.7	−0 19 10.4	10.0	245 4 8.4	4 8 26.8	10.0	278 43 51.9	5 1 32.5
10.5	202 57 24.2	0 58 4.7	10.5	251 34 3.0	4 27 53.4	10.5	284 53 27.4	5 0 22.8
11.0	209 57 16.9	−1 35 41.3	11.0	257 59 33.8	−4 43 41.5	11.0	290 59 58.9	−4 55 45.7
11.5	216 52 17.4	2 11 26.3	11.5	264 20 42.3	4 55 46.8	11.5	297 3 37.9	4 47 49.1
12.0	223 42 5.6	2 44 50.0	12.0	270 37 34.9	5 4 8.4	12.0	303 4 39.9	4 36 42.4
12.5	230 26 28.0	3 15 27.7	12.5	276 50 23.0	5 8 48.2	12.5	309 3 24.4	4 22 36.1
13.0	237 5 18.2	3 42 59.9	13.0	282 59 22.5	5 9 50.1	13.0	315 0 14.8	4 5 41.6
13.5	243 38 36.5	−4 7 11.7	13.5	289 4 53.8	−5 7 19.9	13.5	320 55 38.2	−3 46 10.9
14.0	250 6 29.6	4 27 52.6	14.0	295 7 21.5	5 1 24.8	14.0	326 50 5.1	3 24 16.4
14.5	256 29 10.0	4 44 56.0	14.5	301 7 13.9	4 52 13.1	14.5	332 44 9.2	3 0 10.8
15.0	262 46 55.4	4 58 18.7	15.0	307 5 2.0	4 39 54.0	15.0	338 38 26.9	2 34 7.2
15.5	269 0 8.3	5 8 0.2	15.5	313 1 19.7	4 24 36.8	15.5	344 33 36.6	2 6 19.3
16.0	275 9 15.0	−5 14 2.0	16.0	318 56 43.0	−4 6 31.6	16.0	350 30 18.6	−1 37 1.2
16.5	281 14 44.8	5 16 27.2	16.5	324 51 49.5	3 45 48.9	16.5	356 29 14.4	1 6 27.9
17.0	287 17 9.5	5 15 20.5	17.0	330 47 17.8	3 22 39.6	17.0	2 31 6.0	0 34 55.3
17.5	293 17 2.9	5 10 47.4	17.5	336 43 47.1	2 57 15.3	17.5	8 36 34.9	−0 2 40.4
18.0	299 15 0.0	5 2 54.2	18.0	342 41 56.5	2 29 48.3	18.0	14 46 21.9	+0 29 58.1
18.5	305 11 36.4	−4 51 47.9	18.5	348 42 24.3	−2 0 32.2	18.5	21 1 6.0	+1 2 39.8
19.0	311 7 27.7	4 37 35.9	19.0	354 45 47.6	1 29 41.6	19.0	27 21 22.1	1 35 2.4
19.5	317 3 9.5	4 20 26.4	19.5	0 52 41.7	0 57 32.8	19.5	33 47 41.6	2 6 41.3
20.0	322 59 16.6	4 0 28.3	20.0	7 3 39.2	−0 24 24.0	20.0	40 20 29.8	2 37 10.1
20.5	328 56 22.5	3 37 51.5	20.5	13 19 8.8	+0 9 24.8	20.5	47 0 4.6	3 6 0.1
21.0	334 54 58.9	−3 12 46.9	21.0	19 39 35.1	+0 43 31.0	21.0	53 46 35.5	+3 32 41.0
21.5	340 55 35.8	2 45 26.7	21.5	26 5 17.6	1 17 29.8	21.5	60 40 2.0	3 56 41.9
22.0	346 58 40.7	2 16 4.7	22.0	32 36 29.6	1 50 54.2	22.0	67 40 12.8	4 17 31.8
22.5	353 4 38.4	1 44 56.5	22.5	39 13 17.7	2 23 15.2	22.5	74 46 44.6	4 34 40.9
23.0	359 13 50.5	1 12 19.6	23.0	45 55 41.3	2 54 2.4	23.0	81 59 2.8	4 47 41.6
23.5	5 26 35.5	−0 38 33.5	23.5	52 43 31.7	+3 22 44.1	23.5	89 16 21.8	+4 56 10.8
24.0	11 43 7.9	−0 4 0.0	24.0	59 36 32.4	3 48 48.9	24.0	96 37 46.1	4 59 50.7
24.5	18 3 38.4	+0 30 57.0	24.5	66 34 19.3	4 11 46.3	24.5	104 2 13.1	4 58 30.2
25.0	24 28 13.9	1 5 51.6	25.0	73 36 21.4	4 31 7.7	25.0	111 28 35.0	4 52 5.9
25.5	30 56 57.1	1 40 16.2	25.5	80 42 1.6	4 46 28.1	25.5	118 55 42.6	4 40 42.4
26.0	37 29 46.7	+2 13 41.7	26.0	87 50 38.2	+4 57 26.4	26.0	126 22 27.8	+4 24 32.2
26.5	44 6 37.3	2 45 38.5	26.5	95 1 26.3	5 3 47.0	26.5	133 47 47.2	4 3 55.3
27.0	50 47 20.0	3 15 36.9	27.0	102 13 40.2	5 5 20.1	27.0	141 10 44.3	3 39 17.9
27.5	57 31 42.6	3 43 7.5	27.5	109 26 35.1	5 2 2.2	27.5	148 30 31.5	3 11 11.4
28.0	64 19 30.4	4 7 42.1	28.0	116 39 28.7	4 53 56.2	28.0	155 46 30.9	2 40 10.5
28.5	71 10 26.5	+4 28 54.6	28.5	123 51 42.5	+4 41 11.2	28.5	162 58 14.8	+2 6 52.0
29.0	78 4 12.1	4 46 21.7	29.0	131 2 43.5	4 24 1.8	29.0	170 5 25.5	1 31 53.3
29.5	85 0 27.9	4 59 43.5	29.5	138 12 4.3	4 2 47.4	29.5	177 7 54.2	0 55 51.5
30.0	91 58 54.3	5 8 43.9	30.0	145 19 23.5	3 37 51.9	30.0	184 5 39.7	+0 19 22.6
30.5	98 59 11.7	5 13 11.1	30.5	152 24 25.6	3 9 42.5	30.5	190 58 47.0	−0 16 59.6
31.0	106 1 1.3	+5 12 57.9	31.0	159 27 0.4	+2 38 48.9	31.0	197 47 26.1	−0 52 43.5
31.5	113 4 5.4	+5 8 1.8	31.5	166 27 2.2	+2 5 42.5	31.5	204 31 49.9	−1 27 20.

GREENWICH MEAN NOON.

Date.	MOON'S EQUATOR.			Γ′	☊	☾
	i	*Δ*	☊′			
	Inclination to the Earth's Equator.	Ascending Node on Earth's Equator to Ascending Node on Ecliptic.	Ascending Node on Earth's Equator.	Longitude of the Moon's Perigee. Daily Motion, + 6′.684.	Mean Longitude of Moon's Ascending Node. Daily Motion, — 3′.177.	Moon's Mean Longitude.
	° ′	° ′	° ′	° ′	° ′	° ′
Jan. 1	22 8.7	208 43.8	358 12.6	102 36.6	27 5.0	62 35.6
11	22 8.3	208 10.4	358 14.6	103 43.5	26 33.2	194 21.4
21	22 7.9	207 36.9	358 16.5	104 50.3	26 1.5	326 7.3
31	22 7.5	207 3.4	358 18.5	105 57.2	25 29.7	97 53.1
Feb. 10	22 7.2	206 29.9	358 20.5	107 4.0	24 57.9	229 39.0
20	22 6.8	205 56.3	358 22.5	108 10.9	24 26.1	1 24.8
Mar. 1	22 6.4	205 22.7	358 24.4	109 17.7	23 54.4	133 10.6
11	22 6.1	204 49.0	358 26.4	110 24.5	23 22.6	264 56.5
21	22 5.7	204 15.3	358 28.4	111 31.4	22 50.8	36 42.3
31	22 5.4	203 41.6	358 30.4	112 38.2	22 19.0	168 28.1
Apr. 10	22 5.1	203 8.0	358 32.4	113 45.1	21 47.3	300 14.0
20	22 4.8	202 34.4	358 34.4	114 51.9	21 15.5	71 59.8
30	22 4.4	202 0.8	358 36.4	115 58.8	20 43.7	203 45.7
May 10	22 4.1	201 27.2	358 38.5	117 5.6	20 12.0	335 31.5
20	22 3.8	200 53.5	358 40.5	118 12.4	19 40.2	107 17.3
30	22 3.5	200 19.8	358 42.5	119 19.3	19 8.4	239 3.2
June 9	22 3.2	199 46.2	358 44.6	120 26.1	18 36.6	10 49.0
19	22 2.9	199 12.6	358 46.6	121 33.0	18 4.9	142 34.9
29	22 2.7	198 38.9	358 48.7	122 39.8	17 33.1	274 20.7
July 9	22 2.4	198 5.2	358 50.8	123 46.7	17 1.3	46 6.5
19	22 2.2	197 31.5	358 52.9	124 53.5	16 29.5	177 52.3
29	22 2.0	196 57.8	358 54.9	126 0.3	15 57.8	309 38.2
Aug. 8	22 1.8	196 24.1	358 57.0	127 7.2	15 26.0	81 24.0
18	22 1.6	195 50.4	358 59.1	128 14.0	14 54.2	213 9.9
28	22 1.4	195 16.7	359 1.2	129 20.9	14 22.5	344 55.7
Sept. 7	22 1.1	194 42.9	359 3.3	130 27.7	13 50.7	116 41.6
17	22 0.9	194 9.2	359 5.4	131 34.6	13 18.9	248 27.4
27	22 0.7	193 35.5	359 7.5	132 41.4	12 47.1	20 13.2
Oct. 7	22 0.5	193 1.8	359 9.7	133 48.2	12 15.4	151 59.1
17	22 0.3	192 28.0	359 11.8	134 55.1	11 43.6	283 44.9
27	22 0.1	191 54.2	359 13.9	136 1.9	11 11.8	55 30.8
Nov. 6	22 0.0	191 20.5	359 16.1	137 8.8	10 40.1	187 16.6
16	21 59.8	190 46.8	359 18.2	138 15.6	10 8.3	319 2.4
26	21 59.7	190 13.0	359 20.4	139 22.4	9 36.5	90 48.3
Dec. 6	21 59.5	189 39.2	359 22.6	140 29.3	9 4.7	222 34.1
16	21 59.4	189 5.5	359 24.8	141 36.1	8 33.0	354 20.0
26	*21 59.3*	*188 31.7*	359 26.9	142 43.0	8 1.2	126 5.8
36	*21 59.2*	*187 57.9*	359 29.1	143 49.8	7 29.4	257 51.6

Mean Solar Days.	Motion of Moon in Mean Longitude.
	° ′
0.1	1 19.06
0.2	2 38.12
0.3	3 57.18
0.4	5 16.23
0.5	6 35.29
0.6	7 54.35
0.7	9 13.41
0.8	10 32.47
0.9	11 51.53
1.0	13 10.58
2.0	26 21.17
3.0	39 31.75
4.0	52 42.33
5.0	65 52.92
6.0	79 3.50
7.0	92 14.09
8.0	105 24.67
9.0	118 35.25
10.0	131 45.84
Hours.	° ′
1	0 32.94
2	1 5.88
3	1 38.82
4	2 11.76
5	2 44.70
6	3 17.65
7	3 50.59
8	4 23.53
9	4 56.47
10	5 29.41
11	6 2.35
12	6 35.29
13	7 8.23
14	7 41.17
15	8 14.11
16	8 47.06
17	9 20.00
18	9 52.94
19	10 25.88
20	10 58.82
21	11 31.76
22	12 4.70
23	12 37.64

QUANTITIES REQUIRED IN COMPUTING THE MOON'S LIBRATION.

ARGUMENT, (☊—λ), or (☊—λ—180°).

☊—λ	μ	$\frac{1}{A}$	B	☊—λ
°	″		° ′	°
0	0.0	39	0 0.0	180
2	0.0	39	0 3.1	178
4	0.1	39	0 6.2	176
6	0.2	39	0 9.3	174
8	0.2	39	0 12.4	172
10	0.2	39	0 15.4	170
12	0.3	40	0 18.5	168
14	0.3	40	0 21.5	166
16	0.3	40	0 24.5	164
18	0.3	41	0 27.4	162
20	0.4	41	0 30.3	160
22	0.4	42	0 33.2	158
24	0.4	42	0 36.1	156
26	0.5	43	0 38.9	154
28	0.5	44	0 41.7	152
30	0.5	45	0 44.4	150
32	0.5	46	0 47.0	148
34	0.5	47	0 49.7	146
36	0.5	48	0 52.2	144
38	0.6	49	0 54.7	142
40	0.6	50	0 57.1	140
42	0.6	52	0 59.4	138
44	0.6	54	1 1.7	136
46	0.6	56	1 3.9	134
48	0.6	58	1 6.0	132
50	0.6	60	1 8.0	130
52	0.6	63	1 10.0	128
54	0.5	66	1 11.8	126
56	0.5	69	1 13.6	124
58	0.5	73	1 15.3	122
60	0.5	77	1 16.9	120
62	0.5	83	1 18.4	118
64	0.5	89	1 19.8	116
66	0.4	95	1 21.1	114
68	0.4	103	1 22.3	112
70	0.4	113	1 23.4	110
72	0.4	125	1 24.4	108
74	0.3	141	1 25 3	106
76	0.3	160	1 26.1	104
78	0.2	186	1 26.8	102
80	0.2	222	1 27.4	100
82	0.2	278	1 27.9	98
84	0.1	370	1 28.3	96
86	0.1	554	1 28.6	94
88	0.0	1110	1 28.7	92
90	0.0	∞	1 28.8	90

μ has the sign of tan (λ — ☊)
A has the sign of cos (☊ — λ)
B has the sign of sin (☊ — λ)
See formulæ, page 566.

SUN'S ABERRATION AND HORIZONTAL PARALLAX.

FOR GREENWICH MEAN NOON.

Date.		Aberration. (*Struve.*)	Hor. Par.
1912.		″	″
Jan.	1	— 20.79	8.95
	11	20.78	8.95
	21	20.77	8 94
	31	20.75	8.93
Feb.	10	20.71	8.92
	20	— 20.67	8.90
March	1	20.62	8.87
	11	20.57	8.85
	21	20.51	8.83
	31	20.45	8.81
April	10	— 20.39	8.78
	20	20.34	8.76
	30	20.28	8.73
May	10	20.23	8.71
	20	20.19	8.69
	30	— 20.16	8.68
June	9	20.13	8.67
	19	20.11	8.66
	29	20.10	8.65
July	9	20.10	8.66
	19	— 20.11	8.66
	29	20.13	8.67
Aug.	8	20.16	8.68
	18	20.20	8.70
	28	20.24	8.72
Sept.	7	— 20.29	8.74
	17	20.34	8.76
	27	20.40	8.78
Oct.	7	20.46	8.81
	17	20.52	8.83
	27	— 20.58	8.86
Nov.	6	20.63	8.88
	16	20:68	8.90
	26	20.72	8.92
Dec.	6	20.75	8.93
	16	— 20.77	8.94
	26	20.79	8.95
	36	— 20.79	8.95

Sun's Mean Equatorial Horizontal Parallax.

8″.80; log = 0.94448.

PRECESSION AND OBLIQUITY, 1912.

(CONSTANTS OF PARIS CONFERENCE.)

FOR GREENWICH MEAN NOON.

Date.	Precession in Longitude from 1912.0.	Nutation.			Obliquity of Ecliptic. (*Newcomb.*)	Date.	Precession in Longitude from 1912.0.	Nutation.			Obliquity of Ecliptic. (*Newcomb.*)
		δ′ψ In Longitude.	δ′α In R. A.	δ′ω In Obliquity.				δ′ψ In Longitude.	δ′α In R. A.	δ′ω In Obliquity.	
	"	"	s	"	23° 27′ "		"	"	s	"	23° 27′ "
Jan. 1	− 0.03	−7.25	−0.443	+7.62	10.26	July 4	+25.42	−4.50	−0.276	+8.24	10.64
6	+ 0.66	6.96	0.426	7.69	10.32	9	26.11	4.26	0.261	8.30	10.69
11	1.35	6.70	0.410	7.76	10.39	14	26.80	4.03	0.247	8.37	10.75
16	2.03	6.46	0.395	7.84	10.47	19	27.49	3.83	0.234	8.44	10.82
21	2.72	6.25	0.382	7.94	10.56	24	28.17	3.66	0.224	8.53	10.90
26	+ 3.41	−6.07	−0.371	+8.05	10.66	29	+28.86	−3.51	−0.215	+8.62	10.99
31	4.10	5.93	0.363	8.17	10.77	Aug. 3	29.55	3.40	0.208	8.72	11.08
Feb. 5	4.79	5.83	0.357	8.28	10.87	8	30.24	3.32	0.203	8.83	11.18
10	5.47	5.78	0.354	8.39	10.98	13	30.93	3.28	0.200	8.93	11.28
15	6.16	5.77	0.353	8.50	11.09	18	31.61	3.27	0.200	9.02	11.37
20	+ 6.85	−5.79	−0.354	+8.61	11.19	23	+32.30	−3.29	−0.201	+9.11	11.45
25	7.54	5.84	0.357	8.71	11.28	28	32.99	3.33	0.204	9.20	11.53
Mar. 1	8.23	5.91	0.361	8.79	11.35	Sept. 2	33.68	3.41	0.209	9.28	11.60
6	8.91	6.02	0.368	8.86	11.41	7	34.36	3.51	0.215	9.34	11.66
11	9.60	6.15	0.376	8.91	11.46	12	35.05	3.63	0.222	9.39	11.70
16	+10.29	−6.28	−0.384	+8.95	11.50	17	+35.74	−3.76	−0.230	+9.42	11.73
21	10.98	6.42	0.393	8.98	11.52	22	36.43	3.89	0.238	9.44	11.74
26	11.67	6.57	0.402	8.98	11.52	27	37.12	4.03	0.246	9.45	11.74
31	12.35	6.71	0.410	8.97	11.50	Oct. 2	37.80	4.16	0.254	9.44	11.72
Apr. 5	13.04	6.83	0.418	8.95	11.47	7	38.49	4.29	0.262	9.41	11.69
10	+13.73	−6.93	−0.424	+8.91	11.42	12	+39.18	−4.40	−0.269	+9.36	11.64
15	14.42	7.01	0.429	8.86	11.36	17	39.87	4.48	0.274	9.30	11.57
20	15.10	7.07	0.432	8.79	11.29	22	40.56	4.54	0.278	9.23	11.50
25	15.79	7.09	0.433	8.72	11.22	27	41.24	4.57	0.279	9.16	11.42
30	16.48	7.07	0.432	8.65	11.14	Nov. 1	41.93	4.56	0.278	9.08	11.33
May 5	+17.17	−7.03	−0.430	+8.58	11.06	6	+42.62	−4.50	−0.275	+8.99	11.23
10	17.86	6.95	0.425	8.50	10.97	11	43.31	4.40	0.269	8.90	11.13
15	18.54	6.83	0.418	8.43	10.89	16	43.99	4.26	0.261	8.81	11.04
20	19.23	6.67	0.408	8.36	10.82	21	44.68	4.09	0.251	8.73	10.95
25	19.92	6.49	0.397	8.29	10.75	26	45.37	3.89	0.238	8.65	10.87
30	+20.61	−6.29	−0.385	+8.23	10.68	Dec. 1	+46.06	−3.65	−0.223	+8.58	10.80
June 4	21.30	6.06	0.371	8.19	10.63	6	46.75	3.39	0.207	8.53	10.74
9	21.98	5.82	0.356	8.17	10.60	11	47.43	3.10	0.189	8.50	10.70
14	22.67	5.56	0.340	8.15	10.58	16	48.12	2.79	0.171	8.48	10.67
19	23.36	5.30	0.324	8.15	10.58	21	48.81	2.48	0.152	8.48	10.66
24	+24.05	−5.03	−0.307	+8.16	10.58	26	+49.50	−2.17	−0.133	+8.49	10.67
29	24.73	4.76	0.291	8.19	10.60	31	50.19	1.86	0.114	8.52	10.69
July 4	+25.42	−4.50	−0.276	+8.24	10.64	36	+50.87	−1.56	−0.095	+8.57	10.73

	"	
Precession for 1912 . . .	50.2590	log = 1.70121
Precession in a Solar day .	0.1376	log = 9.13862
Precession in a Sidereal day	0.1372	log = 9.13742

The short period terms of the Nutation are given *for Washington midnight* on pp. 231-232.

Mean Obliquity, 1912.0.	° ′ "
Newcomb	23 27 2.64
Hansen	23 27 2.40
Le Verrier	23 27 2.32
Peters	23 27 2.18

PART II.

ASTRONOMICAL EPHEMERIS FOR THE MERIDIAN OF WASHINGTON.

FORMULÆ FOR THE REDUCTION OF STARS

FROM MEAN TO APPARENT PLACE FOR THE YEAR 1912.

The constants of precession, nutation and aberration adopted by the *Conférence Internationale des Étoiles Fondamentales* which met in Paris in May, 1896, are given on page XII, and together with the notation of Bessel are used in the formulæ which follow.

BESSELIAN STAR-NUMBERS.

Terms of Long Period.	*Terms of Short Period.*
$A=\tau-0.342\,19\sin\text{☊}$	$-0.004\,05\sin 2\text{☾}$
$+0.004\,15\sin 2\text{☊}$	$+0.000\,23\sin(\text{☾}+\Gamma')$
$-0.025\,26\sin 2\text{L}$	$+0.001\,34\sin(\text{☾}-\Gamma')$
$+0.002\,51\sin(\text{L}-\Gamma)$	$-0.000\,68\sin(2\text{☾}-\text{☊})$
$-0.000\,99\sin(3\text{L}-\Gamma)$	$-0.000\,52\sin(3\text{☾}-\Gamma')$
$+0.000\,42\sin(\text{L}+\Gamma)$	$+0.000\,30\sin(\text{☾}-2\text{L}+\Gamma')$
$+0.000\,25\sin(2\text{L}-\text{☊})$	$+0.000\,12\sin 2(\text{☾}-\text{L})$
$''$	$''$
$B=-9.210\cos\text{☊}$	$-0.088\cos 2\text{☾}$
$+0.090\cos 2\text{☊}$	$-0.018\cos(2\text{☾}-\text{☊})$
$-0.552\cos 2\text{L}$	$-0.011\cos(3\text{☾}-\Gamma')$
$-0.022\cos(3\text{L}-\Gamma)$	$+0.005\cos(\text{☾}+\Gamma')$
$+0.009\cos(\text{L}+\Gamma)$	
$+0.007\cos(2\text{L}-\text{☊})$	

$C=-20.4700\cos\omega\cos\odot$

$D=-20.4700\sin\odot$

$E=-0.0419\sin\text{☊}+0''.0005\sin 2\text{☊}-0''.0031\sin 2\text{L}$

BESSEL'S *Star-Constants.*

$a=3^s.072\,56+1^s.336\,39\sin\alpha_0\tan\delta_0$

$b=\frac{1}{15}\cos\alpha_0\tan\delta_0$

$c=\frac{1}{15}\cos\alpha_0\sec\delta_0$

$d=\frac{1}{15}\sin\alpha_0\sec\delta_0$

$a'=20''.0458\cos\alpha_0$

$b'=-\sin\alpha_0$

$c'=\tan\omega\cos\delta_0-\sin\alpha_0\sin\delta_0$

$d'=\cos\alpha_0\sin\delta_0$

Formulæ for Reduction to Apparent Position.

$$^*\alpha=\alpha_0+\tau\mu+Aa+Bb+Cc+Dd+\tfrac{1}{15}E \qquad \text{(in time)}$$
$$\delta=\delta_0+\tau\mu'+Aa'+Bb'+Cc'+Dd' \qquad \text{(in arc)}$$

INDEPENDENT STAR-NUMBERS.

$$f+f'=+46''.0884\,A+E\ \text{(in arc)}=3^s.072\,56\,A+\tfrac{1}{15}E \qquad \text{(in time)}$$
$$f'=-0^s.0124\sin 2\text{☾}+0^s.0041\sin(\text{☾}-\Gamma')+0^s.0007\sin(\text{☾}+\Gamma')$$
$$-0^s.0021\sin(2\text{☾}-\text{☊})-0^s.0016\sin(3\text{☾}-\Gamma')$$
$$+0^s.0009\sin(\text{☾}-2\text{L}+\Gamma')+0^s.0004\sin 2(\text{☾}-\text{L})$$

$g\sin G=B$

$g\cos G=20''.0458\,A$

$h\sin H=C$

$h\cos H=D$

$i=C\tan\omega$

Formulæ for Reduction to Apparent Position.

$$^*\alpha=\alpha_0+f+f'+\tau\mu+\tfrac{1}{15}g\sin(G+\alpha_0)\tan\delta_0+\tfrac{1}{15}h\sin(H+\alpha_0)\sec\delta_0 \qquad \text{(in time)}$$
$$\delta=\delta_0+\tau\mu'+g\cos(G+\alpha_0)+h\cos(H+\alpha_0)\sin\delta_0+i\cos\delta_0 \qquad \text{(in arc)}$$

In the above formulæ

τ denotes the time reckoned in units of one year, from the beginning of the Besselian fictitious year (1912, January 1^d.006, Washington mean time),

α_0, δ_0, the star's mean R. A. and Decl. at the beginning of the fictitious year,

α, δ, the star's apparent right ascension and declination at the time τ,

μ, μ', the annual proper motion in right ascension and declination,

$\odot$, the Sun's true longitude,
L, the Sun's mean longitude,
☊, the longitude of the Moon's ascending node,

ω, the obliquity of the ecliptic,
Γ, the long. of the Sun's perigee,
Γ', the long. of the Moon's perigee,
☾, the Moon's mean longitude.

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* See page 217 for statement concerning the use of these formulæ.

The independent star-numbers are more convenient than BESSEL'S, when only one or two apparent positions of a star are required, or when BESSEL'S star-constants are not known with sufficient accuracy.

In using the star-constants of the *British Association Catalogue*, $a, b, c, d, a', b', c', d'$, with the star-numbers of this Ephemeris, the quantities to be computed are $Ac, Bd, Ca, Db, -Ac', -Bd', -Ca', -Db'$.

In the computation of the independent star-numbers given for Washington mean midnight of each day of the year, on pages 222–229, the short-period terms—that is, the terms involving the Moon's mean longitude—have been included in the two columns headed G and Log g. The quantities f and f' correspond to f' and f'', respectively, as given on the page of constants in Part IV of the American Ephemeris for the years 1901 to 1911, inclusive, and are tabulated in the third and fourth columns, respectively, giving separately the effect of the long-period and short-period terms. f' differs but slightly from the term $-0''.1866 \sin 2$ ☾ $+0''.0622 \sin$ (☾ $-\Gamma'$) given on page 37 of the *Procès-Verbaux* of the Paris Conference, and also on page 289 of the American Ephemeris and Nautical Almanac for 1900. In computing the reduction of stars from mean to apparent place, or vice versa, using the independent star-numbers, the quantity f' (which is the same for all stars) should be omitted in using the formulæ for α on page 216, in case it is desired to make the reduction in conformity with the decision of the Paris Conference with reference to this matter. See page of *Procès-Verbaux* above cited.

In the computation of the Besselian star-numbers, pages 218–221, all short-period terms have been included, and hence in using these quantities in the reduction of stars to apparent place by means of the formula for that purpose on page 216, f' must be subtracted from the final result if it is desired, in compliance with the decision of the Paris Conference, to omit that quantity.

In computing the ephemerides of the circumpolar stars in this volume, all short-period terms have been included, excepting the quantity f' above mentioned, which has been omitted.

In the computation of the ephemerides of the ten-day stars, no short-period terms have been included. These terms attain two maxima and two minima during the tropical month. At maximum and minimum they may amount in right ascension to $\pm 0^{s}.008 \tan \delta$, and in declination to $\pm 0''.13$. For computing the effect of these terms for the correction of the positions of stars interpolated from the ten-day ephemerides, the following formulæ may be used, in which $\Delta\alpha$ and $\Delta\delta$ denote the effect of the short-period terms in right ascension and declination, respectively, and $\delta''\psi$ and $\delta''\omega$, the sum of the short-period terms of the nutation in longitude and obliquity:

$$\Delta\alpha = D'_{\psi}\alpha\ \delta''\psi + D_{\omega}\alpha\ \delta''\omega$$
$$\Delta\delta = D_{\psi}\delta\ \delta''\psi + D_{\omega}\delta\ \delta''\omega$$

The values of $\delta''\psi$ and of $\delta''\omega$ for Washington mean midnight are given for each day of the year on pages 231–232, and have been computed as follows:

$$\delta''\psi = 50''.37\, A_2 \qquad \delta''\omega = -B_2$$

in which A_2 and B_2 are the sums of the short-period terms given in the expressions for A and B on page 216.

The quantities $D'_{\psi}\alpha$, $D_{\omega}\alpha$, $D_{\psi}\delta$, and $D_{\omega}\delta$ are given for each ten-day star on pages 287–486, and have been computed by means of the following formulæ:

$$D'_{\psi}\alpha = \tfrac{1}{15} \sin\alpha \tan\delta \sin\omega \qquad D_{\omega}\alpha = -\tfrac{1}{15} \cos\alpha \tan\delta$$
$$D_{\psi}\delta = \cos\alpha \sin\omega \qquad D_{\omega}\delta = \sin\alpha$$

The complete derivative of the right ascension with reference to ψ is

$$D_{\psi}\alpha = \tfrac{1}{15} (\cos\omega + \sin\alpha \tan\delta \sin\omega)$$

and the omission of the term $\frac{1}{15} \cos\omega$ is made in accordance with the above-mentioned decision of the Paris Conference with reference to the quantity f'.

FOR WASHINGTON MEAN MIDNIGHT.

Solar Day. (Sid. Hr.)	Log *A.*	Log *B.*	Log *C.*	Log *D.*	Solar Day. (Sid. Hr.)	Log *A.*	Log *B.*	Log *C.*	Log *D.*
Jan. 0	−9.18033	−0.8800	−0.48873	+1.30519	Feb. 15	+8.14457	−0.9282	−1.19321	+1.05656
1	9.16438	0.8780	0.53279	1.30384	16	8.22763	0.9314	1.19824	1.04491
2	9.14504	0.8771	0.57266	1.30234	17	8.27990	0.9346	1.20308	1.03280
3	9.12366	0.8776	0.60905	1.30070	18	8.31006	0.9376	1.20772	1.02022
4	9.10212	0.8797	0.64249	1.29891	h 19	8.32469	0.9397	1.21219	1.00713
h 5	−9.08243	−0.8829	−0.67342	+1.29698	(10.0) 20	+8.33183	−0.9410	−1.21647	+0.99350
(7.0) 6	9.06614	0.8867	0.70216	1.29491	21	8.34064	0.9411	1.22058	0.97929
7	9.05392	0.8903	0.72898	1.29268	22	8.36022	0.9402	1.22451	0.96447
8	9.04521	0.8930	0.75412	1.29031	23	8.39550	0.9386	1.22827	0.94900
9	9.03846	0.8945	0.77775	1.28778	24	8.44654	0.9369	1.23187	0.93282
10	−9.03177	−0.8947	−0.80003	+1.28510	25	+8.50705	−0.9358	−1.23530	+0.91589
11	9.02325	0.8939	0.82109	1.28227	26	8.56855	0.9357	1.23857	0.89815
12	9.01153	0.8925	0.84105	1.27928	27	8.62438	0.9369	1.24168	0.87952
13	8.99599	0.8909	0.86000	1.27613	28	8.66978	0.9393	1.24463	0.85992
14	8.97653	0.8899	0.87802	1.27282	29	8.70286	0.9426	1.24743	0.83928
15	−8.95371	−0.8894	−0.89519	+1.26934	Mar. 1	+8.72423	−0.9460	−1.25008	+0.81747
16	8.92819	0.8899	0.91157	1.26571	2	8.73566	0.9489	1.25258	0.79438
17	8.90119	0.8913	0.92723	1.26190	3	8.74035	0.9509	1.25493	0.76987
18	8.87413	0.8937	0.94220	1.25792	4	8.74234	0.9517	1.25714	0.74377
19	8.84868	0.8967	0.95654	1.25376	h 5	8.74556	0.9514	1.25920	0.71587
h 20	−8.82627	−0.9002	−0.97029	+1.24943	(11.0) 6	+8.75309	−0.9502	−1.26112	+0.68592
(8.0) 21	8.80821	0.9036	0.98348	1.24491	7	8.76654	0.9486	1.26290	0.65363
22	8.79491	0.9066	0.99615	1.24022	8	8.78546	0.9469	1.26454	0.61862
23	8.78533	0.9089	1.00831	1.23533	9	8.80801	0.9457	1.26604	0.58041
24	8.77714	0.9099	1.02002	1.23025	10	8.83193	0.9453	1.26740	0.53839
25	−8.76686	−0.9098	−1.03127	+1.22497	11	+8.85547	−0.9455	−1.26863	+0.49173
26	8.75074	0.9087	1.04211	1.21949	12	8.87692	0.9466	1.26972	0.43933
27	8.72526	0.9071	1.05255	1.21380	13	8.89510	0.9484	1.27068	0.37961
28	8.68798	0.9056	1.06260	1.20791	14	8.90936	0.9507	1.27150	0.31024
29	8.63719	0.9050	1.07229	1.20179	15	8.91930	0.9531	1.27220	0.22751
30	−8.57334	−0.9057	−1.08163	+1.19545	16	+8.92517	−0.9553	−1.27275	+0.12513
31	8.49928	0.9077	1.09064	1.18888	17	8.92758	0.9569	1.27318	9.99083
Feb. 1	8.42062	0.9110	1.09933	1.18208	18	8.92783	0.9577	1.27348	9.79530
2	8.34577	0.9150	1.10771	1.17503	19	8.92794	0.9574	1.27364	+9.43015
3	8.28398	0.9189	1.11580	1.16773	20	8.93024	0.9560	1.27367	−8.93215
h 4	−8.24030	−0.9222	−1.12360	+1.16016	h 21	+8.93678	−0.9539	−1.27358	−9.64353
(9.0) 5	8.21112	0.9244	1.13113	1.15233	(12.0) 22	8.94871	0.9515	1.27335	9.89998
6	8.18526	0.9254	1.13840	1.14421	23	8.96561	0.9493	1.27299	0.05995
7	8.14953	0.9253	1.14541	1.13581	24	8.98577	0.9480	1.27251	0.17643
8	8.08884	0.9244	1.15218	1.12710	25	9.00671	0.9479	1.27189	0.26802
9	−7.98453	−0.9232	−1.15870	+1.11808	26	+9.02579	−0.9491	−1.27114	−0.34347
10	7.79796	0.9222	1.16500	1.10874	27	9.04106	0.9512	1.27026	0.40758
11	−7.36736	0.9217	1.17107	1.09905	28	9.05155	0.9537	1.26926	0.46329
12	+7.29226	0.9221	1.17692	1.08900	29	9.05736	0.9560	1.26812	0.51251
13	7.79796	0.9233	1.18255	1.07859	30	9.05967	0.9574	1.26685	0.55657
14	+8.01536	−0.9254	−1.18798	+1.06778	31	+9.06029	−0.9578	−1.26544	−0.59643
15	+8.14457	−0.9282	−1.19321	+1.05656	Apr. 1	+9.06119	−0.9570	−1.26391	−0.63280

$E = -0''.02 = -0^{s}.001$

[Eph 12]

FOR WASHINGTON MEAN MIDNIGHT.

Solar Day. (Sid. Hr.)	Log *A*.	Log *B*.	Log *C*.	Log *D*.	Solar Day. (Sid. Hr.)	Log *A*.	Log *B*.	Log *C*.	Log *D*.
Apr. 1	+9.06119	−0.9570	−1.26391	−0.63280	May 17	+9.37870	−0.9185	−1.01112	−1.23414
2	9.06402	0.9552	1.26224	0.66622	18	9.38925	0.9168	0.99972	1.23882
3	9.06978	0.9528	1.26044	0.69711	19	9.39986	0.9165	0.98790	1.24332
4	9.07864	0.9503	1.25850	0.72582	20	9.40949	0.9175	0.97562	1.24765
5	9.09006	0.9480	1.25642	0.75261	21	9.41737	0.9194	0.96287	1.25181
h (13.0) 6	+9.10301	−0.9464	−1.25421	−0.77771	h (16.0) 22	+9.42315	−0.9216	−0.94960	−1.25581
7	9.11625	0.9456	1.25186	0.80131	23	9.42701	0.9234	0.93581	1.25966
8	9.12884	0.9457	1.24937	0.82356	24	9.42953	0.9242	0.92144	1.26335
9	9.14008	0.9465	1.24674	0.84459	25	9.43160	0.9237	0.90646	1.26688
10	9.14944	0.9478	1.24397	0.86452	26	9.43404	0.9221	0.89082	1.27026
11	+9.15655	−0.9494	−1.24105	−0.88344	27	+9.43755	−0.9194	−0.87448	−1.27350
12	9.16129	0.9509	1.23798	0.90145	28	9.44244	0.9164	0.85738	1.27659
13	9.16401	0.9520	1.23477	0.91861	29	9.44869	0.9136	0.83946	1.27953
14	9.16543	0.9523	1.23140	0.93498	30	9.45601	0.9112	0.82064	1.28233
15	9.16648	0.9516	1.22789	0.95063	31	9.46382	0.9098	0.80086	1.28500
16	+9.16838	−0.9497	−1.22422	−0.96560	June 1	+9.47165	−0.9093	−0.78000	−1.28752
17	9.17248	0.9471	1.22039	0.97995	2	9.47904	0.9098	0.75798	1.28992
18	9.17968	0.9439	1.21641	0.99370	3	9.48568	0.9110	0.73466	1.29217
19	9.19005	0.9409	1.21226	1.00691	4	9.49132	0.9127	0.70988	1.29430
20	9.20286	0.9385	1.20795	1.01959	5	9.49587	0.9146	0.68348	1.29629
h (14.0) 21	+9.21677	−0.9373	−1.20346	−1.03179	h (17.0) 6	+9.49937	−0.9163	−0.65526	−1.29815
22	9.23019	0.9374	1.19881	1.04352	7	9.50201	0.9175	0.62494	1.29989
23	9.24174	0.9386	1.19398	1.05481	8	9.50417	0.9177	0.59223	1.30149
24	9.25046	0.9405	1.18898	1.06569	9	9.50640	0.9169	0.55672	1.30297
25	9.25620	0.9424	1.18380	1.07618	10	9.50929	0.9150	0.51792	1.30433
26	+9.25944	−0.9437	−1.17843	−1.08629	11	+9.51333	−0.9124	−0.47519	−1.30556
27	9.26117	0.9440	1.17287	1.09604	12	9.51882	0.9095	0.42765	1.30666
28	9.26270	0.9430	1.16711	1.10545	13	9.52572	0.9070	0.37414	1.30764
29	9.26524	0.9408	1.16115	1.11453	14	9.53365	0.9055	0.31297	1.30850
30	9.26961	0.9379	1.15499	1.12330	15	9.54193	0.9053	0.24162	1.30924
May 1	+9.27599	−0.9348	−1.14861	−1.13177	16	+9.54977	−0.9066	−0.15608	−1.30985
2	9.28425	0.9319	1.14202	1.13995	17	9.55649	0.9090	0.04931	1.31034
3	9.29378	0.9296	1.13520	1.14786	18	9.56171	0.9120	9.90729	1.31072
4	9.30382	0.9281	1.12815	1.15550	19	9.56545	0.9147	9.69474	1.31097
5	9.31364	0.9276	1.12086	1.16288	20	9.56797	0.9166	−9.26117	1.31110
h (15.0) 6	+9.32269	−0.9279	−1.11332	−1.17001	h (18.0) 21	+9.56986	−0.9172	+9.11465	−1.31111
7	9.33059	0.9288	1.10553	1.17691	22	9.57179	0.9168	9.64618	1.31100
8	9.33706	0.9301	1.09748	1.18357	23	9.57433	0.9152	9.87805	1.31077
9	9.34199	0.9314	1.08914	1.19001	24	9.57780	0.9130	0.02829	1.31042
10	9.34551	0.9325	1.08052	1.19623	25	9.58230	0.9107	0.13960	1.30994
11	+9.34803	−0.9329	−1.07161	−1.20224	26	+9.58764	−0.9088	+0.22801	−1.30935
12	9.35013	0.9323	1.06238	1.20804	27	9.59349	0.9080	0.30132	1.30864
13	9.35256	0.9306	1.05284	1.21364	28	9.59947	0.9080	0.36392	1.30780
14	9.35617	0.9280	1.04295	1.21904	29	9.60524	0.9089	0.41852	1.30684
15	9.36167	0.9247	1.03272	1.22426	30	9.61048	0.9108	0.46690	1.30577
16	+9.36928	−0.9213	−1.02211	−1.22929	July 1	+9.61498	−0.9132	+0.51032	−1.30456
17	+9.37870	−0.9185	−1.01112	−1.23414	2	+9.61868	−0.9159	+0.54968	−1.30324

$E = -0''.02 = -0^s.001$

FOR WASHINGTON MEAN MIDNIGHT.

Solar Day. (Sid. Hr.)	Log *A.*	Log *B.*	Log *C.*	Log *D.*	Solar Day. (Sid. Hr.)	Log *A.*	Log *B.*	Log *C.*	Log *D.*
July 1	+9.61498	−0.9132	+0.51032	−1.30456	Aug. 16	+9.74773	−0.9578	+1.18114	−1.08126
2	9.61868	0.9159	0.54968	1.30324	17	9.74890	0.9568	1.18637	1.07108
3	9.62154	0.9185	0.58566	1.30178	18	9.75071	0.9554	1.19141	1.06052
4	9.62369	0.9206	0.61878	1.30021	19	9.75320	0.9541	1.19627	1.04957
5	9.62535	0.9219	0.64944	1.29850	20	9.75620	0.9533	1.20096	1.03821
^{h}(19.0) 6	+9.62688	−0.9223	+0.67796	−1.29667	^{h}(22.0) 21	+9.75943	−0.9534	+1.20548	−1.02641
7	9.62873	0.9216	0.70462	1.29471	22	9.76263	0.9543	1.20984	1.01415
8	9.63132	0.9200	0.72963	1.29262	23	9.76559	0.9561	1.21403	1.00140
9	9.63495	0.9180	0.75316	1.29040	24	9.76814	0.9585	1.21806	0.98814
10	9.63971	0.9162	0.77537	1.28805	25	9.77017	0.9612	1.22193	0.97433
11	+9.64540	−0.9151	+0.79639	−1.28556	26	+9.77161	−0.9639	+1.22565	−0.95993
12	9.65158	0.9152	0.81633	1.28294	27	9.77250	0.9665	1.22921	0.94490
13	9.65764	0.9168	0.83528	1.28018	28	9.77296	0.9683	1.23263	0.92919
14	9.66304	0.9197	0.85332	1.27728	29	9.77315	0.9694	1.23589	0.91276
15	9.66736	0.9232	0.87052	1.27424	30	9.77334	0.9695	1.23902	0.89555
16	+9.67050	−0.9267	+0.88696	−1.27105	31	+9.77386	−0.9688	+1.24200	−0.87748
17	9.67259	0.9296	0.90268	1.26772	Sept. 1	9.77496	0.9673	1.24484	0.85850
18	9.67398	0.9314	0.91774	1.26425	2	9.77684	0.9656	1.24753	0.83850
19	9.67518	0.9319	0.93218	1.26062	3	9.77949	0.9641	1.25009	0.81740
20	9.67670	0.9313	0.94604	1.25684	4	9.78273	0.9635	1.25251	0.79508
^{h}(20.0) 21	+9.67891	−0.9301	+0.95935	−1.25291	^{h}(23.0) 5	+9.78623	−0.9640	+1.25479	−0.77139
22	9.68189	0.9285	0.97215	1.24882	6	9.78958	0.9657	1.25695	0.74620
23	9.68559	0.9273	0.98447	1.24456	7	9.79239	0.9683	1.25896	0.71930
24	9.68979	0.9267	0.99633	1.24014	8	9.79441	0.9714	1.26085	0.69048
25	9.69419	0.9270	1.00776	1.23556	9	9.79558	0.9742	1.26260	0.65946
26	+9.69848	−0.9283	+1.01879	−1.23080	10	+9.79610	−0.9762	+1.26422	−0.62589
27	9.70241	0.9305	1.02942	1.22587	11	9.79626	0.9771	1.26571	0.58935
28	9.70581	0.9332	1.03968	1.22075	12	9.79646	0.9768	1.26708	0.54930
29	9.70855	0.9363	1.04959	1.21546	13	9.79702	0.9755	1.26831	0.50501
30	9.71061	0.9393	1.05917	1.20997	14	9.79815	0.9737	1.26941	0.45552
31	+9.71206	−0.9420	+1.06842	−1.20429	15	+9.79991	−0.9719	+1.27039	−0.39949
Aug. 1	9.71303	0.9440	1.07736	1.19841	16	9.80220	0.9703	1.27124	0.33496
2	9.71378	0.9450	1.08601	1.19232	17	9.80483	0.9695	1.27196	0.25895
3	9.71465	0.9450	1.09437	1.18602	18	9.80749	0.9696	1.27256	0.16654
4	9.71599	0.9441	1.10245	1.17951	19	9.80998	0.9704	1.27303	0.04881
^{h} 5	+9.71811	−0.9428	+1.11028	−1.17276	^{h}(0.0) 20	+9.81214	−0.9719	+1.27337	−9.88646
(21.0) 6	9.72116	0.9414	1.11785	1.16579	21	9.81385	0.9739	1.27359	9.62383
7	9.72505	0.9404	1.12517	1.15858	22	9.81509	0.9759	1.27368	−8.85057
8	9.72949	0.9405	1.13226	1.15112	23	9.81583	0.9778	1.27364	+9.44559
9	9.73405	0.9418	1.13911	1.14340	24	9.81615	0.9791	1.27347	9.79864
10	+9.73824	−0.9444	+1.14574	−1.13541	25	+9.81621	−0.9797	+1.27318	+9.99077
11	9.74165	0.9478	1.15215	1.12715	26	9.81622	0.9793	1.27276	0.12348
12	9.74411	0.9514	1.15835	1.11860	27	9.81644	0.9782	1.27221	0.22495
13	9.74564	0.9546	1.16434	1.10974	28	9.81714	0.9761	1.27154	0.30708
14	9.74648	0.9570	1.17014	1.10058	29	9.81849	0.9737	1.27073	0.37605
15	+9.74705	−0.9580	+1.17574	−1.09109	30	+9.82055	−0.9714	+1.26979	+0.43547
16	+9.74773	−0.9578	+1.18114	−1.08126	Oct. 1	+9.82325	−0.9697	+1.26873	+0.48766

E = $-0''.01 = -0^{s}.001$

[Eph 12]

FOR WASHINGTON MEAN MIDNIGHT.

Solar Day. (Sid. Hr.)	Log *A*.	Log *B*.	Log *C*.	Log *D*.	Solar Day. (Sid. Hr.)	Log *A*.	Log *B*.	Log *C*.	Log *D*.
Oct. 1	+9.82325	−0.9697	+1.26873	+0.48766	Nov. 16	+9.90145	−0.9463	+1.03754	+1.22185
2	9.82630	0.9691	1.26753	0.53415	17	9.90256	0.9472	1.02662	1.22720
3	9.82934	0.9699	1.26620	0.57606	18	9.90339	0.9475	1.01526	1.23236
4	9.83200	0.9712	1.26473	0.61418	h 19	9.90409	0.9469	1.00346	1.23732
h 5	9.83400	0.9733	1.26313	0.64913	(4.0) 20	9.90486	0.9454	0.99119	1.24210
(1.0) 6	+9.83528	−0.9755	+1.26139	+0.68137	21	+9.90590	−0.9430	+0.97842	+1.24669
7	9.83587	0.9771	1.25951	0.71128	22	9.90742	0.9400	0.96512	1.25110
8	9.83607	0.9776	1.25750	0.73916	23	9.90951	0.9368	0.95125	1.25534
9	9.83622	0.9769	1.25534	0.76525	24	9.91217	0.9339	0.93678	1.25940
10	9.83665	0.9751	1.25305	0.78976	25	9.91527	0.9318	0.92166	1.26329
11	+9.83760	−0.9726	+1.25061	+0.81284	26	+9.91855	−0.9311	+0.90585	+1.26702
12	9.83916	0.9699	1.24802	0.83465	27	9.92170	0.9316	0.88930	1.27058
13	9.84127	0.9674	1.24528	0.85530	28	9.92445	0.9333	0.87194	1.27397
14	9.84377	0.9655	1.24240	0.87490	29	9.92661	0.9354	0.85371	1.27721
15	9.84640	0.9645	1.23936	0.89354	30	9.92816	0.9374	0.83453	1.28029
16	+9.84895	−0.9643	+1.23617	+0.91129	Dec. 1	+9.92921	−0.9385	+0.81432	+1.28322
17	9.85124	0.9649	1.23283	0.92823	2	9.93001	0.9385	0.79296	1.28599
18	9.85315	0.9660	1.22932	0.94442	3	9.93084	0.9372	0.77035	1.28861
19	9.85460	0.9674	1.22565	0.95990	h 4	9.93199	0.9348	0.74634	1.29108
h 20	9.85560	0.9686	1.22182	0.97474	(5.0) 5	9.93361	0.9318	0.72078	1.29339
(2.0) 21	+9.85623	−0.9695	+1.21782	+0.98896	6	+9.93575	−0.9288	+0.69346	+1.29557
22	9.85660	0.9696	1.21364	1.00261	7	9.93832	0.9264	0.66415	1.29760
23	9.85689	0.9689	1.20930	1.01573	8	9.94113	0.9249	0.63257	1.29947
24	9.85731	0.9673	1.20477	1.02834	9	9.94400	0.9244	0.59835	1.30121
25	9.85812	0.9648	1.20006	1.04047	10	9.94671	0.9250	0.56104	1.30280
26	+9.85949	−0.9617	+1.19516	+1.05215	11	+9.94915	−0.9263	+0.52007	+1.30426
27	9.86151	0.9586	1.19007	1.06340	12	9.95122	0.9281	0.47466	1.30557
28	9.86412	0.9560	1.18478	1.07425	13	9.95292	0.9300	0.42379	1.30674
29	9.86716	0.9543	1.17929	1.08471	14	9.95426	0.9317	0.36599	1.30777
30	9.87031	0.9539	1.17360	1.09480	15	9.95533	0.9328	0.29913	1.30866
31	+9.87321	−0.9545	+1.16768	+1.10454	16	+9.95620	−0.9333	+0.21990	+1.30942
Nov. 1	9.87559	0.9561	1.16156	1.11393	17	9.95709	0.9328	0.12273	1.31003
2	9.87730	0.9579	1.15520	1.12301	18	9.95815	0.9314	9.99717	1.31051
3	9.87835	0.9593	1.14861	1.13177	19	9.95956	0.9292	9.81961	1.31085
h 4	9.87897	0.9598	1.14178	1.14024	h 20	9.96144	0.9267	+9.51384	1.31105
(3.0) 5	+9.87944	−0.9589	+1.13470	+1.14842	(6.0) 21	+9.96384	−0.9244	−7.86396	+1.31112
6	9.88008	0.9570	1.12737	1.15632	22	9.96667	0.9228	9.53289	1.31105
7	9.88114	0.9542	1.11976	1.16395	23	9.96974	0.9224	9.82918	1.31084
8	9.88278	0.9510	1.11189	1.17132	24	9.97280	0.9234	0.00361	1.31049
9	9.88497	0.9479	1.10372	1.17844	25	9.97556	0.9256	0.12762	1.31001
10	+9.88758	−0.9452	+1.09526	+1.18532	26	+9.97782	−0.9286	−0.22388	+1.30938
11	9.89041	0.9436	1.08650	1.19196	27	9.97952	0.9316	0.30251	1.30862
12	9.89323	0.9429	1.07741	1.19837	28	9.98069	0.9339	0.36896	1.30772
13	9.89583	0.9431	1.06798	1.20456	29	9.98155	0.9352	0.42646	1.30668
14	9.89810	0.9440	1.05821	1.21053	30	9.98234	0.9352	0.47712	1.30550
15	+9.89998	−0.9451	+1.04807	+1.21630	31	+9.98331	−0.9340	−0.52236	+1.30418
16	+9.90145	−0.9463	+1.03754	+1.22185	32	+9.98463	−0.9321	−0.56321	+1.30272

$E = -0''.01 = -0^{s}.001$

FOR WASHINGTON MEAN MIDNIGHT.

Solar Day. (Sidereal Hour.)		τ	f	f′	G		H		Log g.	Log h.	i	Log i.
			In Time.	In Time.	In Arc.	In Time.	In Arc.	In Time.				
		y	s	s	° ′	h m	° ′	h m			″	
Jan.	0	−0.0014	−0.449	−0.018	248 10.9	16 32.7	351 19.4	23 25.3	0.91221	1.31019	−1.34	−0.1260
	1	+0.0014	0.437	0.013	248 48.5	16 35.2	350 23.1	23 21.5	0.90832	1.30998	1.48	0.1701
	2	0.0041	0.425	−0.006	249 37.0	16 38.5	349 26.7	23 17.8	0.90506	1.30975	1.62	0.2099
	3	0.0068	0.413	+0.003	250 32.5	16 42.2	348 30.2	23 14.0	0.90308	1.30950	1.76	0.2463
	4	0.0096	0.401	0.011	251 30.0	16 46.0	347 33.6	23 10.2	0.90267	1.30923	1.90	0.2798
h	5	0.0123	−0.389	+0.016	252 23.6	16 49.6	346 37.0	23 6.5	0.90372	1.30894	−2.04	−0.3106
(7.0)	6	0.0150	0.378	0.018	253 8.5	16 52.6	345 40.3	23 2.7	0.90575	1.30863	2.18	0.3394
	7	0.0178	0.366	0.016	253 42.6	16 54.8	344 43.5	22 58.9	0.90803	1.30830	2.32	0.3663
	8	0.0205	0.354	0.011	254 6.7	16 56.4	343 46.7	22 55.1	0.90987	1.30795	2.46	0.3914
	9	0.0232	0.342	+0.005	254 23.7	16 57.6	342 49.7	22 51.3	0.91076	1.30758	2.60	0.4150
	10	0.0260	−0.331	−0.001	254 37.9	16 58.5	341 52.7	22 47.5	0.91050	1.30719	−2.74	−0.4373
	11	0.0287	0.319	0.006	254 53.4	16 59.6	340 55.5	22 43.7	0.90916	1.30680	2.87	0.4584
	12	0.0315	0.307	0.009	255 13.7	17 0.9	339 58.2	22 39.9	0.90707	1.30638	3.01	0.4783
	13	0.0342	0.296	0.010	255 40.7	17 2.7	339 0.8	22 36.1	0.90467	1.30594	3.14	0.4972
	14	0.0369	0.284	0.008	256 14.7	17 5.0	338 3.3	22 32.2	0.90244	1.30548	3.28	0.5152
	15	0.0397	−0.273	−0.004	256 54.8	17 7.7	337 5.7	22 28.4	0.90079	1.30501	−3.41	−0.5324
	16	0.0424	0.262	+0.001	257 39.0	17 10.6	336 8.0	22 24.5	0.90001	1.30453	3.54	0.5488
	17	0.0452	0.251	0.005	258 24.7	17 13.6	335 10.1	22 20.7	0.90024	1.30403	3.67	0.5645
	18	0.0479	0.240	0.009	259 9.1	17 16.6	334 12.1	22 16.8	0.90150	1.30351	3.80	0.5795
	19	0.0506	0.229	0.011	259 49.6	17 19.3	333 14.0	22 12.9	0.90361	1.30298	3.92	0.5938
h	20	0.0534	−0.218	+0.011	260 24.2	17 21.6	332 15.7	22 9.0	0.90630	1.30245	−4.05	−0.6076
(8.0)	21	0.0561	0.207	0.009	260 51.6	17 23.4	331 17.3	22 5.2	0.90919	1.30189	4.18	0.6208
	22	0.0588	0.197	+0.004	261 11.6	17 24.8	330 18.8	22 1.3	0.91180	1.30132	4.30	0.6334
	23	0.0616	0.186	−0.002	261 25.4	17 25.7	329 20.1	21 57.3	0.91370	1.30074	4.42	0.6456
	24	0.0643	0.176	0.009	261 36.1	17 26.4	328 21.4	21 53.4	0.91457	1.30015	4.54	0.6573
	25	0.0671	−0.165	−0.015	261 47.6	17 27.2	327 22.4	21 49.5	0.91423	1.29956	−4.66	−0.6686
	26	0.0698	0.155	0.019	262 4.1	17 28.3	326 23.3	21 45.6	0.91282	1.29895	4.78	0.6794
	27	0.0725	0.145	0.019	262 29.1	17 29.9	325 24.1	21 41.6	0.91080	1.29833	4.90	0.6898
	28	0.0753	0.135	0.016	263 4.5	17 32.3	324 24.7	21 37.6	0.90878	1.29771	5.01	0.6999
	29	0.0780	0.125	0.010	263 49.4	17 35.3	323 25.1	21 33.7	0.90747	1.29707	5.12	0.7096
	30	0.0808	−0.115	−0.001	264 40.2	17 38.7	322 25.4	21 29.7	0.90748	1.29643	−5.24	−0.7189
	31	0.0835	0.105	+0.007	265 31.4	17 42.1	321 25.6	21 25.7	0.90901	1.29578	5.34	0.7279
Feb.	1	0.0862	0.095	0.014	266 17.4	17 45.2	320 25.5	21 21.7	0.91189	1.29513	5.45	0.7366
	2	0.0890	0.086	0.017	266 54.4	17 47.6	319 25.4	21 17.7	0.91556	1.29448	5.56	0.7450
	3	0.0917	0.076	0.016	267 20.4	17 49.4	318 25.0	21 13.7	0.91936	1.29382	5.66	0.7531
h	4	0.0944	−0.067	+0.012	267 36.8	17 50.5	317 24.5	21 9.6	0.92258	1.29316	−5.77	−0.7609
(9.0)	5	0.0972	0.057	+0.006	267 46.8	17 51.1	316 23.9	21 5.6	0.92474	1.29250	5.87	0.7684
	6	0.0999	0.048	0.000	267 54.7	17 51.6	315 23.0	21 1.5	0.92565	1.29184	5.97	0.7757
	7	0.1026	0.039	−0.005	268 4.5	17 52.3	314 22.0	20 57.5	0.92546	1.29118	6.06	0.7827
	8	0.1054	0.030	0.009	268 19.4	17 53.3	313 20.8	20 53.4	0.92451	1.29052	6.16	0.7895
	9	0.1081	−0.021	−0.010	268 40.7	17 54.7	312 19.5	20 49.3	0.92326	1.28986	−6.25	−0.7960
	10	0.1109	0.012	0.008	269 8.3	17 56.6	311 18.0	20 45.2	0.92220	1.28921	6.34	0.8023
	11	0.1136	−0.003	−0.005	269 40.9	17 58.7	310 16.2	20 41.1	0.92172	1.28855	6.43	0.8084
	12	0.1163	+0.005	0.000	270 16.2	18 1.1	309 14.4	20 37.0	0.92208	1.28790	6.52	0.8142
	13	0.1191	0.014	+0.005	270 51.7	18 3.4	308 12.4	20 32.8	0.92337	1.28725	6.60	0.8198
	14	0.1218	+0.022	+0.009	271 24.8	18 5.7	307 10.2	20 28.7	0.92554	1.28661	−6.69	−0.8252
	15	0.1246	+0.031	+0.011	271 53.5	18 7.6	306 7.9	20 24.5	0.92840	1.28598	−6.77	−0.8305

FOR WASHINGTON MEAN MIDNIGHT.

lar Day. Sidereal Hour.)		τ	f	f′	G		H		Log g.	Log h.	i	Log i.
			In Time.	In Time.	In Arc.	In Time.	In Arc.	In Time.				
		y	s	s	° ′	h m	° ′	h m			″	
eb.	15	0.1246	+0.031	+0.011	271 53.5	18 7.6	306 7.9	20 24.5	0.92840	1.28598	−6.77	−0.8305
	16	0.1273	0.039	0.012	272 16.3	18 9.1	305 5.4	20 20.4	0.93167	1.28535	6.85	0.8355
	17	0.1300	0.047	0.011	272 32.7	18 10.2	304 2.7	20 16.2	0.93500	1.28474	6.92	0.8404
	18	0.1328	0.055	0.007	272 42.5	18 10.8	302 59.9	20 12.0	0.93800	1.28412	7.00	0.8450
h	19	0.1355	0.063	+0.001	272 47.1	18 11.1	301 57.0	20 7.8	0.94027	1.28353	7.07	0.8495
10.0)	20	0.1382	+0.071	−0.006	272 49.5	18 11.3	300 53.9	20 3.6	0.94153	1.28294	−7.14	−0.8538
	21	0.1410	0.079	0.013	272 52.9	18 11.5	299 50.7	19 59.4	0.94166	1.28237	7.21	0.8579
	22	0.1437	0.087	0.017	273 1.1	18 12.1	298 47.3	19 55.2	0.94080	1.28181	7.27	0.8618
	23	0.1465	0.095	0.019	273 17.1	18 13.1	297 43.8	19 50.9	0.93935	1.28126	7.34	0.8656
	24	0.1492	0.102	0.017	273 42.4	18 14.8	296 40.2	19 46.7	0.93788	1.28072	7.40	0.8692
	25	0.1519	+0.110	−0.012	274 16.2	18 17.1	295 36.5	19 42.4	0.93703	1.28020	−7.46	−0.8726
	26	0.1547	0.117	−0.004	274 55.2	18 19.7	294 32.6	19 38.2	0.93731	1.27970	7.51	0.8758
	27	0.1574	0.125	+0.004	275 34.5	18 22.3	293 28.7	19 33.9	0.93897	1.27921	7.57	0.8789
	28	0.1602	0.132	0.011	276 9.1	18 24.6	292 24.6	19 29.6	0.94183	1.27873	7.62	0.8819
	29	0.1629	0.139	0.015	276 35.1	18 26.3	291 20.5	19 25.4	0.94543	1.27828	7.67	0.8847
ar.	1	0.1656	+0.146	+0.016	276 51.6	18 27.4	290 16.2	19 21.1	0.94907	1.27785	−7.72	−0.8874
	2	0.1684	0.153	0.013	276 59.7	18 28.0	289 11.8	19 16.8	0.95214	1.27742	7.76	0.8899
	3	0.1711	0.160	0.008	277 2.3	18 28.2	288 7.4	19 12.5	0.95417	1.27703	7.80	0.8922
	4	0.1738	0.167	+0.001	277 3.4	18 28.2	287 2.9	19 8.2	0.95501	1.27665	7.84	0.8944
h	5	0.1766	0.174	−0.005	277 6.8	18 28.5	285 58.3	19 3.9	0.95475	1.27629	7.88	0.8965
11.0)	6	0.1793	+0.181	−0.009	277 15.3	18 29.0	284 53.6	18 59.6	0.95369	1.27596	−7.91	−0.8984
	7	0.1820	0.188	0.010	277 30.6	18 30.0	283 48.9	18 55.3	0.95230	1.27565	7.95	0.9002
	8	0.1848	0.195	0.009	277 52.2	18 31.5	282 44.1	18 50.9	0.95104	1.27535	7.98	0.9018
	9	0.1875	0.202	0.006	278 18.3	18 33.2	281 39.2	18 46.6	0.95032	1.27509	8.00	0.9033
	10	0.1903	0.209	−0.001	278 46.7	18 35.1	280 34.3	18 42.3	0.95035	1.27484	8.03	0.9047
	11	0.1930	+0.216	+0.004	279 15.2	18 37.0	279 29.3	18 38.0	0.95122	1.27462	−8.05	−0.9059
	12	0.1957	0.222	0.008	279 41.3	18 38.8	278 24.4	18 33.6	0.95287	1.27441	8.07	0.9070
	13	0.1985	0.229	0.011	280 3.3	18 40.2	277 19.4	18 29.3	0.95515	1.27424	8.09	0.9080
	14	0.2012	0.236	0.012	280 19.8	18 41.3	276 14.4	18 25.0	0.95778	1.27408	8.11	0.9088
	15	0.2040	0.243	0.011	280 30.4	18 42.0	275 9.3	18 20.6	0.96044	1.27396	8.12	0.9095
	16	0.2067	+0.249	+0.008	280 35.6	18 42.4	274 4.3	18 16.3	0.96277	1.27384	−8.13	−0.9100
	17	0.2094	0.256	+0.003	280 36.8	18 42.5	272 59.3	18 12.0	0.96444	1.27377	8.14	0.9105
	18	0.2122	0.262	−0.003	280 36.0	18 42.4	271 54.3	18 7.6	0.96519	1.27372	8.14	0.9108
	19	0.2149	0.269	0.010	280 36.6	18 42.4	270 49.3	18 3.3	0.96488	1.27368	8.15	0.9109
	20	0.2176	0.276	0.015	280 41.8	18 42.8	269 44.3	17 59.0	0.96367	1.27367	8.15	0.9110
h	21	0.2204	+0.283	−0.018	280 54.4	18 43.6	268 39.4	17 54.6	0.96184	1.27370	−8.14	−0.9109
12.0)	22	0.2231	0.289	0.017	281 15.9	18 45.1	267 34.6	17 50.3	0.95994	1.27374	8.14	0.9106
	23	0.2259	0.296	0.013	281 45.4	18 47.0	266 29.8	17 46.0	0.95854	1.27380	8.13	0.9103
	24	0.2286	0.303	−0.006	282 20.0	18 49.3	265 25.0	17 41.7	0.95817	1.27390	8.12	0.9098
	25	0.2313	0.309	+0.002	282 55.5	18 51.7	264 20.4	17 37.4	0.95907	1.27402	8.11	0.9092
	26	0.2341	+0.316	+0.009	283 27.1	18 53.8	263 15.8	17 33.1	0.96118	1.27415	−8.10	−0.9084
	27	0.2368	0.323	0.014	283 51.0	18 55.4	262 11.3	17 28.8	0.96402	1.27431	8.08	0.9075
	28	0.2396	0.330	0.016	284 5.8	18 56.4	261 6.9	17 24.5	0.96699	1.27450	8.06	0.9065
	29	0.2423	0.336	0.014	284 12.4	18 56.8	260 2.6	17 20.2	0.96947	1.27471	8.04	0.9054
	30	0.2450	0.343	0.009	284 13.9	18 56.9	258 58.4	17 15.9	0.97101	1.27494	8.02	0.9041
	31	0.2478	+0.350	+0.002	284 14.4	18 57.0	257 54.3	17 11.6	0.97137	1.27519	−7.99	−0.9027
pr.	1	0.2505	+0.356	−0.004	284 17.6	18 57.2	256 50.4	17 7.4	0.97064	1.27547	−7.97	−0.9012

FOR WASHINGTON MEAN MIDNIGHT.

Solar Day. (Sidereal Hour.)	τ	f	f′	G		H		Log g.	Log h.	i	Log i.
		In Time.	In Time.	In Arc.	In Time.	In Arc.	In Time.				
	y	s	s	° ′	h m	° ′	h m			″	
Apr. 1	0.2505	+0.356	−0.004	284 17.6	18 57.2	256 50.4	17 7.4	0.97064	1.27547	−7.97	−0.9012
2	0.2532	0.363	0.008	284 26.4	18 57.8	255 46.5	17 3.1	0.96911	1.27577	7.94	0.8995
3	0.2560	0.370	0.011	284 42.2	18 58.8	254 42.8	16 58.9	0.96722	1.27609	7.90	0.8977
4	0.2587	0.377	0.010	285 4.6	19 0.3	253 39.2	16 54.6	0.96545	1.27642	7.87	0.8958
5	0.2614	0.384	0.007	285 32.2	19 2.1	252 35.7	16 50.4	0.96418	1.27677	7.83	0.8937
h (13.0) 6	0.2642	+0.391	−0.003	286 2.2	19 4.1	251 32.4	16 46.2	0.96366	1.27715	−7.79	−0.8915
7	0.2669	0.398	+0.002	286 32.2	19 6.1	250 29.2	16 41.9	0.96397	1.27755	7.75	0.8891
8	0.2697	0.405	0.007	286 59.7	19 8.0	249 26.2	16 37.7	0.96506	1.27796	7.70	0.8866
9	0.2724	0.413	0.010	287 23.0	19 9.5	248 23.4	16 33.6	0.96676	1.27839	7.66	0.8840
10	0.2751	0.420	0.012	287 41.3	19 10.8	247 20.7	16 29.4	0.96881	1.27884	7.61	0.8812
11	0.2779	+0.427	+0.012	287 54.0	19 11.6	246 18.1	16 25.2	0.97092	1.27931	−7.56	−0.8783
12	0.2806	0.435	0.009	288 1.5	19 12.1	245 15.7	16 21.0	0.97274	1.27979	7.50	0.8753
13	0.2834	0.442	+0.005	288 5.3	19 12.4	244 13.5	16 16.9	0.97398	1.28028	7.45	0.8720
14	0.2861	0.450	−0.001	288 7.9	19 12.5	243 11.5	16 12.8	0.97438	1.28079	7.39	0.8687
15	0.2888	0.457	0.008	288 12.1	19 12.8	242 9.6	16 8.6	0.97383	1.28131	7.33	0.8652
16	0.2916	+0.465	−0.014	288 20.8	19 13.4	241 8.0	16 4.5	0.97241	1.28184	−7.27	−0.8615
17	0.2943	0.473	0.017	288 36.9	19 14.5	240 6.4	16 0.4	0.97042	1.28239	7.21	0.8577
18	0.2970	0.481	0.017	289 1.9	19 16.1	239 5.2	15 56.3	0.96834	1.28295	7.14	0.8537
19	0.2998	0.489	0.014	289 35.1	19 18.3	238 4.0	15 52.3	0.96674	1.28352	7.07	0.8495
20	0.3025	0.497	−0.008	290 13.6	19 20.9	237 3.2	15 48.2	0.96612	1.28410	7.00	0.8452
h (14.0) 21	0.3053	+0.505	0.000	290 53.0	19 23.5	236 2.4	15 44.2	0.96678	1.28468	−6.93	−0.8407
22	0.3080	0.513	+0.008	291 28.5	19 25.9	235 1.9	15 40.1	0.96862	1.28528	6.86	0.8361
23	0.3107	0.521	0.014	291 56.5	19 27.8	234 1.6	15 36.1	0.97127	1.28588	6.78	0.8313
24	0.3135	0.529	0.016	292 15.3	19 29.0	233 1.5	15 32.1	0.97414	1.28649	6.70	0.8263
25	0.3162	0.538	0.015	292 25.9	19 29.7	232 1.7	15 28.1	0.97659	1.28710	6.62	0.8211
26	0.3190	+0.546	+0.011	292 31.5	19 30.1	231 2.0	15 24.1	0.97816	1.28772	−6.54	−0.8157
27	0.3217	0.555	+0.005	292 35.7	19 30.4	230 2.5	15 20.2	0.97860	1.28835	6.46	0.8102
28	0.3244	0.563	−0.002	292 42.8	19 30.9	229 3.2	15 16.2	0.97797	1.28897	6.37	0.8044
29	0.3272	0.572	0.008	292 55.9	19 31.7	228 4.2	15 12.3	0.97657	1.28960	6.29	0.7984
30	0.3299	0.581	0.011	293 16.7	19 33.1	227 5.3	15 8.4	0.97482	1.29023	6.20	0.7923
May 1	0.3326	+0.590	−0.011	293 44.2	19 34.9	226 6.6	15 4.4	0.97322	1.29087	−6.11	−0.7859
2	0.3354	0.599	0.009	294 17.0	19 37.1	225 8.2	15 0.5	0.97216	1.29150	6.02	0.7793
3	0.3381	0.608	−0.005	294 52.5	19 39.5	224 9.9	14 56.7	0.97190	1.29214	5.92	0.7725
4	0.3408	0.617	0.000	295 27.5	19 41.8	223 11.8	14 52.8	0.97251	1.29277	5.83	0.7654
5	0.3436	0.626	+0.005	295 59.6	19 44.0	222 14.0	14 48.9	0.97390	1.29340	5.73	0.7581
h (15.0) 6	0.3463	+0.635	+0.009	296 27.2	19 45.8	221 16.3	14 45.1	0.97590	1.29403	−5.63	−0.7506
7	0.3491	0.645	0.012	296 49.3	19 47.3	220 18.8	14 41.3	0.97823	1.29465	5.53	0.7428
8	0.3518	0.655	0.012	297 5.9	19 48.4	219 21.5	14 37.4	0.98060	1.29528	5.43	0.7348
9	0.3545	0.664	0.010	297 17.3	19 49.2	218 24.3	14 33.6	0.98271	1.29589	5.33	0.7264
10	0.3573	0.674	+0.006	297 25.3	19 49.7	217 27.3	14 29.8	0.98429	1.29650	5.22	0.7178
11	0.3600	+0.684	0.000	297 32.2	19 50.1	216 30.6	14 26.0	0.98512	1.29711	−5.12	−0.7089
12	0.3627	0.693	−0.007	297 40.9	19 50.7	215 34.0	14 22.3	0.98511	1.29771	5.01	0.6997
13	0.3655	0.703	0.013	297 54.3	19 51.6	214 37.6	14 18.5	0.98433	1.29831	4.90	0.6901
14	0.3682	0.713	0.017	298 15.0	19 53.0	213 41.4	14 14.8	0.98306	1.29889	4.79	0.6802
15	0.3710	0.723	0.018	298 44.1	19 54.9	212 45.4	14 11.0	0.98176	1.29947	4.68	0.6700
16	0.3737	+0.733	−0.016	299 21.0	19 57.4	211 49.5	14 7.3	0.98099	1.30004	−4.56	−0.6594
17	0.3764	+0.744	−0.010	300 2.7	20 0.2	210 53.7	14 3.6	0.98117	1.30060	−4.45	−0.6484

FOR WASHINGTON MEAN MIDNIGHT.

Solar Day. (Sidereal Hour.)	τ	f	f′	G	G	H	H	Log g.	Log h.	i	Log i.
		In Time.	In Time.	In Arc.	In Time.	In Arc.	In Time.				
	y	s	s	° ′	h m	° ′	h m			″	
May 17	0.3764	+0.744	−0.010	300 2.7	20 0.2	210 53.7	14 3.6	0.98117	1.30060	−4.45	−0.6484
18	0.3792	0.754	−0.002	300 45.1	20 3.0	209 58.1	13 59.9	0.98259	1.30115	4.34	0.6370
19	0.3819	0.764	+0.006	301 23.4	20 5.6	209 2.7	13 56.2	0.98517	1.30169	4.22	0.6252
20	0.3847	0.774	0.013	301 53.9	20 7.6	208 7.5	13 52.5	0.98854	1.30222	4.10	0.6129
21	0.3874	0.785	0.017	302 15.1	20 9.0	207 12.5	13 48.8	0.99214	1.30274	3.98	0.6002
h (16.0) 22	0.3901	+0.796	+0.017	302 28.0	20 9.9	206 17.6	13 45.2	0.99535	1.30324	−3.86	−0.5869
23	0.3929	0.806	0.014	302 35.5	20 10.4	205 22.8	13 41.5	0.99772	1.30374	3.74	0.5731
24	0.3956	0.817	0.008	302 41.7	20 10.8	204 28.2	13 37.9	0.99902	1.30422	3.62	0.5587
25	0.3984	0.828	+0.001	302 50.8	20 11.4	203 33.7	13 34.2	0.99930	1.30468	3.50	0.5437
26	0.4011	0.839	−0.006	303 5.6	20 12.4	202 39.3	13 30.6	0.99885	1.30514	3.37	0.5281
27	0.4038	+0.850	−0.010	303 27.7	20 13.8	201 45.1	13 27.0	0.99811	1.30558	−3.25	−0.5118
28	0.4066	0.861	0.011	303 56.5	20 15.8	200 51.1	13 23.4	0.99755	1.30600	3.12	0.4947
29	0.4093	0.872	0.010	304 30.2	20 18.0	199 57.1	13 19.8	0.99755	1.30641	3.00	0.4767
30	0.4120	0.883	0.006	305 5.9	20 20.4	199 3.3	13 16.2	0.99837	1.30680	2.87	0.4579
31	0.4148	0.894	−0.001	305 40.6	20 22.7	198 9.5	13 12.6	1.00002	1.30719	2.74	0.4381
June 1	0.4175	+0.905	+0.004	306 11.9	20 24.8	197 15.9	13 9.1	1.00240	1.30755	−2.61	−0.4173
2	0.4202	0.916	0.008	306 38.0	20 26.5	196 22.4	13 5.5	1.00530	1.30790	2.48	0.3953
3	0.4230	0.928	0.011	306 58.6	20 27.9	195 29.0	13 1.9	1.00847	1.30822	2.36	0.3719
4	0.4257	0.939	0.012	307 13.5	20 28.9	194 35.6	12 58.4	1.01162	1.30854	2.22	0.3472
5	0.4285	0.951	0.011	307 23.6	20 29.6	193 42.4	12 54.8	1.01450	1.30884	2.09	0.3208
h (17.0) 6	0.4312	+0.963	+0.007	307 30.3	20 30.0	192 49.2	12 51.3	1.01687	1.30912	−1.96	−0.2925
7	0.4339	0.974	+0.002	307 36.1	20 30.4	191 56.1	12 47.7	1.01857	1.30938	1.83	0.2622
8	0.4367	0.985	−0.005	307 43.6	20 30.9	191 3.1	12 44.2	1.01953	1.30962	1.70	0.2295
9	0.4394	0.997	0.012	307 55.2	20 31.7	190 10.1	12 40.7	1.01985	1.30984	1.56	0.1940
10	0.4422	1.008	0.017	308 13.5	20 32.9	189 17.2	12 37.1	1.01979	1.31006	1.43	0.1552
11	0.4449	+1.020	−0.019	308 39.3	20 34.6	188 24.4	12 33.6	1.01975	1.31025	−1.30	−0.1125
12	0.4476	1.032	0.018	309 11.6	20 36.8	187 31.6	12 30.1	1.02016	1.31042	1.16	0.0649
13	0.4504	1.043	0.013	309 48.2	20 39.2	186 38.9	12 26.6	1.02145	1.31057	1.03	0.0114
14	0.4531	1.055	−0.006	310 25.1	20 41.7	185 46.2	12 23.1	1.02383	1.31070	0.89	9.9502
15	0.4558	1.066	+0.003	310 58.1	20 43.9	184 53.5	12 19.6	1.02728	1.31082	0.76	9.8789
16	0.4586	+1.078	+0.011	311 23.9	20 45.6	184 0.9	12 16.1	1.03142	1.31092	−0.62	−9.7934
17	0.4613	1.090	0.016	311 40.7	20 46.7	183 8.3	12 12.6	1.03572	1.31099	0.49	9.6866
18	0.4641	1.101	0.018	311 49.7	20 47.3	182 15.7	12 9.0	1.03967	1.31106	0.35	9.5446
19	0.4668	1.113	0.016	311 53.6	20 47.6	181 23.2	12 5.5	1.04285	1.31110	0.22	9.3320
20	0.4695	1.125	0.011	311 56.0	20 47.7	180 30.6	12 2.0	1.04504	1.31112	−0.08	−8.8984
h (18.0) 21	0.4723	+1.136	+0.004	312 0.6	20 48.0	179 38.1	11 58.5	1.04629	1.31112	+0.06	+8.7519
22	0.4750	1.148	−0.003	312 10.5	20 48.7	178 45.6	11 55.0	1.04684	1.31110	0.19	9.2835
23	0.4778	1.160	0.008	312 26.8	20 49.8	177 53.1	11 51.5	1.04711	1.31107	0.33	9.5153
24	0.4805	1.171	0.010	312 49.1	20 51.3	177 0.6	11 48.0	1.04752	1.31101	0.46	9.6656
25	0.4832	1.183	0.010	313 15.8	20 53.1	176 8.1	11 44.5	1.04841	1.31093	0.60	9.7769
26	0.4860	+1.195	−0.007	313 44.0	20 54.9	175 15.6	11 41.0	1.04999	1.31083	+0.73	+9.8653
27	0.4887	1.206	−0.002	314 10.9	20 56.7	174 23.1	11 37.5	1.05232	1.31073	0.87	9.9386
28	0.4914	1.218	+0.003	314 34.4	20 58.3	173 30.5	11 34.0	1.05527	1.31060	1.00	0.0012
29	0.4942	1.229	0.007	314 53.2	20 59.5	172 37.9	11 30.5	1.05863	1.31044	1.14	0.0558
30	0.4969	1.241	0.011	315 6.6	21 0.4	171 45.2	11 27.0	1.06217	1.31027	1.27	0.1042
July 1	0.4996	+1.253	+0.012	315 14.8	21 1.0	170 52.6	11 23.5	1.06565	1.31009	+1.40	+0.1476
2	0.5024	+1.264	+0.012	315 18.8	21 1.3	169 59.8	11 20.0	1.06884	1.30989	+1.54	+0.1870

FOR WASHINGTON MEAN MIDNIGHT.

Solar Day. (Sidereal Hour.)	τ	*f*	*f′*	*G*		*H*		Log *g*.	Log *h*.	*i*	Log *i*.
		In Time.	In Time.	In Arc.	In Time.	In Arc.	In Time.				
	y	s	s	° ′	h m	° ′	h m			″	
July 1	0.4996	+1.253	+0.012	315 14.8	21 1.0	170 52.6	11 23.5	1.06565	1.31009	+1.40	+0.1476
2	0.5024	1.264	0.012	315 18.8	21 1.3	169 59.8	11 20.0	1.06884	1.30989	1.54	0.1870
3	0.5051	1.276	0.009	315 19.8	21 1.3	169 7.0	11 16.5	1.07158	1.30966	1.67	0.2229
4	0.5079	1.287	+0.004	315 19.9	21 1.3	168 14.2	11 12.9	1.07372	1.30943	1.80	0.2561
5	0.5106	1.299	−0.003	315 21.2	21 1.4	167 21.3	11 9.4	1.07521	1.30916	1.94	0.2867
h (19.0) 6	0.5133	+1.311	−0.010	315 26.0	21 1.7	166 28.3	11 5.9	1.07614	1.30889	+2.07	+0.3152
7	0.5161	1.322	0.016	315 36.3	21 2.4	165 35.3	11 2.4	1.07672	1.30860	2.20	0.3419
8	0.5188	1.334	0.019	315 52.8	21 3.5	164 42.1	10 58.8	1.07728	1.30829	2.33	0.3669
9	0.5216	1.345	0.019	316 15.1	21 5.0	163 48.9	10 55.3	1.07820	1.30796	2.46	0.3904
10	0.5243	1.356	0.016	316 41.2	21 6.7	162 55.6	10 51.7	1.07983	1.30763	2.59	0.4126
11	0.5270	+1.367	−0.010	317 7.9	21 8.5	162 2.2	10 48.1	1.08236	1.30726	+2.71	+0.4337
12	0.5298	1.378	−0.001	317 31.6	21 10.1	161 8.7	10 44.6	1.08577	1.30689	2.84	0.4537
13	0.5325	1.389	+0.007	317 49.2	21 11.3	160 15.1	10 41.0	1.08981	1.30651	2.97	0.4726
14	0.5352	1.400	0.014	317 59.3	21 12.0	159 21.4	10 37.4	1.09405	1.30610	3.10	0.4906
15	0.5380	1.410	0.017	318 2.4	21 12.2	158 27.6	10 33.8	1.09802	1.30568	3.22	0.5078
16	0.5407	+1.422	+0.016	318 0.8	21 12.1	157 33.7	10 30.2	1.10134	1.30525	+3.34	+0.5242
17	0.5435	1.433	0.012	317 57.6	21 11.8	156 39.7	10 26.6	1.10380	1.30480	3.47	0.5400
18	0.5462	1.444	+0.006	317 56.0	21 11.7	155 45.5	10 23.0	1.10538	1.30434	3.59	0.5550
19	0.5489	1.454	0.000	317 58.5	21 11.9	154 51.2	10 19.4	1.10628	1.30387	3.71	0.5695
20	0.5517	1.465	−0.006	318 6.9	21 12.5	153 56.8	10 15.8	1.10686	1.30338	3.83	0.5833
h (20.0) 21	0.5544	+1.475	−0.009	318 20.7	21 13.4	153 2.3	10 12.2	1.10749	1.30288	+3.95	+0.5966
22	0.5571	1.486	0.009	318 38.6	21 14.6	152 7.7	10 8.5	1.10848	1.30237	4.07	0.6094
23	0.5599	1.496	0.007	318 58.1	21 15.9	151 12.9	10 4.9	1.11003	1.30184	4.19	0.6218
24	0.5626	1.507	−0.003	319 16.8	21 17.1	150 17.9	10 1.2	1.11219	1.30131	4.30	0.6336
25	0.5654	1.517	+0.002	319 32.6	21 18.2	149 22.9	9 57.5	1.11487	1.30077	4.42	0.6450
26	0.5681	+1.527	+0.007	319 44.3	21 19.0	148 27.6	9 53.8	1.11792	1.30022	+4.53	+0.6561
27	0.5708	1.537	0.011	319 51.3	21 19.4	147 32.3	9 50.2	1.12111	1.29966	4.64	0.6667
28	0.5736	1.547	0.013	319 53.8	21 19.6	146 36.7	9 46.4	1.12423	1.29908	4.75	0.6770
29	0.5763	1.557	0.013	319 52.5	21 19.5	145 41.1	9 42.8	1.12711	1.29850	4.86	0.6869
30	0.5790	1.567	0.010	319 48.6	21 19.2	144 45.2	9 39.0	1.12959	1.29792	4.97	0.6964
31	0.5818	+1.577	+0.006	319 43.9	21 18.9	143 49.2	9 35.3	1.13154	1.29733	+5.08	+0.7057
Aug. 1	0.5845	1.587	0.000	319 40.0	21 18.7	142 53.0	9 31.5	1.13294	1.29673	5.18	0.7146
2	0.5873	1.596	−0.007	319 38.9	21 18.6	141 56.6	9 27.8	1.13382	1.29612	5.29	0.7233
3	0.5900	1.606	0.014	319 42.1	21 18.8	141 0.1	9 24.0	1.13434	1.29551	5.39	0.7316
4	0.5927	1.615	0.018	319 50.7	21 19.4	140 3.4	9 20.2	1.13475	1.29490	5.49	0.7397
h 5	0.5955	+1.625	−0.020	320 4.5	21 20.3	139 6.4	9 16.4	1.13540	1.29427	+5.59	+0.7476
(21.0) 6	0.5982	1.634	0.018	320 22.2	21 21.5	138 9.4	9 12.6	1.13660	1.29366	5.69	0.7551
7	0.6010	1.643	0.013	320 41.0	21 22.7	137 12.1	9 8.8	1.13853	1.29305	5.79	0.7624
8	0.6037	1.653	−0.005	320 58.0	21 23.9	136 14.6	9 5.0	1.14122	1.29241	5.88	0.7695
9	0.6064	1.662	+0.003	321 10.3	21 24.7	135 17.0	9 1.1	1.14451	1.29178	5.98	0.7764
10	0.6092	+1.671	+0.010	321 16.5	21 25.1	134 19.1	8 57.3	1.14807	1.29115	+6.07	+0.7830
11	0.6119	1.680	0.015	321 16.5	21 25.1	133 21.1	8 53.4	1.15150	1.29052	6.16	0.7894
12	0.6146	1.689	0.016	321 11.9	21 24.8	132 22.9	8 49.5	1.15442	1.28990	6.25	0.7956
13	0.6174	1.697	0.013	321 5.4	21 24.4	131 24.5	8 45.6	1.15661	1.28927	6.33	0.8016
14	0.6201	1.706	0.008	321 0.0	21 24.0	130 25.8	8 41.7	1.15801	1.28864	6.42	0.8074
15	0.6228	+1.714	+0.001	320 58.1	21 23.9	129 27.1	8 37.8	1.15876	1.28803	+6.50	+0.8130
16	0.6256	+1.723	−0.005	321 1.4	21 24.1	128 28.1	8 33.9	1.15912	1.28742	+6.58	+0.8184

FOR WASHINGTON MEAN MIDNIGHT.

r Day. dereal our.)	r	f	f′	G		H		Log g.	Log h.	i	Log i.
		In Time.	In Time.	In Arc.	In Time.	In Arc.	In Time.				
	y	s	s	° ′	h m	° ′	h m			″	
g. 16	0.6256	+1.723	−0.005	321 1.4	21 24.1	128 28.1	8 33.9	1.15912	1.28742	+6.58	+0.8184
17	0.6283	1.731	0.008	321 9.7	21 24.6	127 29.0	8 29.9	1.15943	1.28681	6.66	0.8236
18	0.6311	1.740	0.009	321 22.2	21 25.5	126 29.6	8 26.0	1.15998	1.28620	6.74	0.8287
19	0.6338	1.748	0.008	321 36.8	21 26.5	125 30.1	8 22.0	1.16100	1.28560	6.82	0.8336
20	0.6365	1.756	−0.004	321 51.3	21 27.4	124 30.4	8 18.0	1.16255	1.28501	6.89	0.8382
h 0) 21	0.6393	+1.764	+0.001	322 3.4	21 28.2	123 30.5	8 14.0	1.16457	1.28442	+6.96	+0.8428
22	0.6420	1.772	0.006	322 12.1	21 28.8	122 30.4	8 10.0	1.16693	1.28384	7.03	0.8471
23	0.6448	1.780	0.010	322 16.6	21 29.1	121 30.2	8 6.0	1.16944	1.28327	7.10	0.8513
24	0.6475	1.788	0.013	322 17.3	21 29.2	120 29.8	8 2.0	1.17193	1.28272	7.17	0.8553
25	0.6502	1.796	0.014	322 14.5	21 29.0	119 29.2	7 57.9	1.17422	1.28217	7.23	0.8592
26	0.6530	+1.804	+0.012	322 9.5	21 28.6	118 28.4	7 53.9	1.17616	1.28164	+7.29	+0.8629
27	0.6557	1.811	0.008	322 3.3	21 28.2	117 27.5	7 49.8	1.17766	1.28111	7.35	0.8665
28	0.6584	1.819	+0.002	321 57.6	21 27.8	116 26.3	7 45.8	1.17867	1.28060	7.41	0.8699
29	0.6612	1.826	−0.005	321 54.3	21 27.6	115 25.0	7 41.7	1.17919	1.28010	7.47	0.8732
30	0.6639	1.834	0.011	321 54.6	21 27.6	114 23.5	7 37.6	1.17935	1.27962	7.52	0.8763
31	0.6667	+1.841	−0.016	321 59.7	21 28.0	113 21.8	7 33.5	1.17936	1.27915	+7.57	+0.8793
pt. 1	0.6694	1.849	0.019	322 9.6	21 28.6	112 20.1	7 29.3	1.17949	1.27870	7.62	0.8821
2	0.6721	1.856	0.019	322 23.5	21 29.6	111 18.1	7 25.2	1.18002	1.27826	7.67	0.8848
3	0.6749	1.863	0.015	322 39.0	21 30.6	110 16.0	7 21.1	1.18116	1.27785	7.72	0.8874
4	0.6776	1.871	−0.008	322 53.8	21 31.6	109 13.7	7 16.9	1.18298	1.27744	7.76	0.8898
h 0) 5	0.6804	+1.878	0.000	323 5.1	21 32.3	108 11.3	7 12.8	1.18540	1.27705	+7.80	+0.8921
6	0.6831	1.885	+0.008	323 11.4	21 32.8	107 8.7	7 8.6	1.18817	1.27669	7.84	0.8942
7	0.6858	1.892	0.013	323 12.1	21 32.8	106 6.0	7 4.4	1.19092	1.27634	7.88	0.8962
8	0.6886	1.899	0.015	323 8.2	21 32.5	105 3.1	7 0.2	1.19330	1.27601	7.91	0.8981
9	0.6913	1.906	0.013	323 1.9	21 32.1	104 0.2	6 56.0	1.19506	1.27570	7.94	0.8999
10	0.6940	+1.913	+0.008	322 56.2	21 31.7	102 57.1	6 51.8	1.19613	1.27541	+7.97	+0.9015
11	0.6968	1.920	+0.002	322 53.3	21 31.6	101 53.9	6 47.6	1.19657	1.27515	8.00	0.9030
12	0.6995	1.927	−0.004	322 55.1	21 31.7	100 50.5	6 43.4	1.19659	1.27490	8.02	0.9044
13	0.7022	1.933	0.008	323 2.1	21 32.1	99 47.1	6 39.1	1.19648	1.27467	8.05	0.9056
14	0.7050	1.939	0.010	323 13.4	21 32.9	98 43.6	6 34.9	1.19654	1.27447	8.07	0.9067
15	0.7077	+1.946	−0.009	323 27.3	21 33.8	97 40.0	6 30.7	1.19700	1.27429	+8.08	+0.9077
16	0.7105	1.953	−0.005	323 41.8	21 34.8	96 36.3	6 26.4	1.19795	1.27413	8.10	0.9085
17	0.7132	1.960	0.000	323 54.8	21 35.7	95 32.6	6 22.2	1.19937	1.27400	8.11	0.9092
18	0.7159	1.966	+0.005	324 4.6	21 36.3	94 28.8	6 17.9	1.20113	1.27389	8.12	0.9098
19	0.7187	1.973	0.010	324 10.7	21 36.7	93 24.9	6 13.7	1.20306	1.27380	8.13	0.9103
) 20	0.7214	+1.980	+0.013	324 13.1	21 36.9	92 21.0	6 9.4	1.20501	1.27374	+8.14	+0.9106
21	0.7242	1.987	0.014	324 12.3	21 36.8	91 17.0	6 5.1	1.20679	1.27370	8.14	0.9109
22	0.7269	1.993	0.013	324 9.3	21 36.6	90 13.0	6 0.9	1.20830	1.27368	8.15	0.9110
23	0.7296	2.000	0.010	324 5.2	21 36.3	89 8.9	5 56.6	1.20941	1.27369	8.15	0.9109
24	0.7324	2.007	+0.005	324 1.4	21 36.1	88 4.8	5 52.3	1.21009	1.27371	8.14	0.9108
25	0.7351	+2.014	−0.002	323 59.3	21 36.0	87 0.7	5 48.0	1.21034	1.27377	+8.14	+0.9105
26	0.7378	2.020	0.008	324 0.5	21 36.0	85 56.6	5 43.8	1.21024	1.27385	8.13	0.9100
27	0.7406	2.027	0.014	324 6.0	21 36.4	84 52.5	5 39.5	1.20996	1.27395	8.12	0.9095
28	0.7433	2.034	0.018	324 16.2	21 37.1	83 48.4	5 35.2	1.20973	1.27408	8.11	0.9088
29	0.7461	2.041	0.018	324 30.4	21 38.0	82 44.2	5 30.9	1.20980	1.27423	8.09	0.9080
30	0.7488	+2.048	−0.015	324 46.7	21 39.1	81 40.1	5 26.7	1.21040	1.27440	+8.07	+0.9071
t. 1	0.7515	+2.054	−0.009	325 3.0	21 40.2	80 36.0	5 22.4	1.21164	1.27460	+8.05	+0.9060

FOR WASHINGTON MEAN MIDNIGHT.

Solar Day. (Sidereal Hour.)		τ	f	f′	G		H		Log g.	Log h.	i	Log i.
			In Time.	In Time.	In Arc.	In Time.	In Arc.	In Time.				
		y	s	s	° ′	h m	° ′	h m			″	
Oct.	1	0.7515	+2.054	−0.009	325 3.0	21 40.2	80 36.0	5 22.4	1.21164	1.27460	+8.05	+0.9060
	2	0.7543	2.061	−0.002	325 16.8	21 41.1	79 31.9	5 18.1	1.21349	1.27482	8.03	0.9048
	3	0.7570	2.068	+0.006	325 26.1	21 41.7	78 27.8	5 13.9	1.21572	1.27506	8.01	0.9035
	4	0.7598	2.075	0.012	325 30.1	21 42.0	77 23.8	5 9.6	1.21803	1.27533	7.98	0.9020
	5	0.7625	2.082	0.014	325 29.5	21 42.0	76 19.8	5 5.3	1.22008	1.27561	7.95	0.9004
h (1.0)	6	0.7652	+2.089	+0.014	325 26.1	21 41.7	75 15.8	5 1.1	1.22164	1.27591	+7.92	+0.8987
	7	0.7680	2.096	0.009	325 22.6	21 41.5	74 11.9	4 56.8	1.22256	1.27624	7.88	0.8968
	8	0.7707	2.103	+0.003	325 21.4	21 41.4	73 8.1	4 52.5	1.22285	1.27660	7.85	0.8948
	9	0.7734	2.110	−0.003	325 24.5	21 41.6	72 4.3	4 48.3	1.22273	1.27696	7.81	0.8926
	10	0.7762	2.118	0.008	325 32.7	21 42.2	71 0.6	4 44.0	1.22245	1.27735	7.77	0.8903
	11	0.7789	+2.125	−0.011	325 45.5	21 43.0	69 57.0	4 39.8	1.22230	1.27776	+7.72	+0.8879
	12	0.7816	2.132	0.010	326 1.4	21 44.1	68 53.5	4 35.6	1.22249	1.27819	7.68	0.8853
	13	0.7844	2.139	0.007	326 18.3	21 45.2	67 50.1	4 31.3	1.22318	1.27863	7.63	0.8826
	14	0.7871	2.146	−0.003	326 34.1	21 46.3	66 46.7	4 27.1	1.22434	1.27909	7.58	0.8797
	15	0.7899	2.153	+0.003	326 47.3	21 47.2	65 43.5	4 22.9	1.22587	1.27957	7.53	0.8766
	16	0.7926	+2.161	+0.008	326 57.0	21 47.8	64 40.4	4 18.7	1.22763	1.28006	+7.47	+0.8734
	17	0.7953	2.168	0.012	327 3.2	21 48.2	63 37.4	4 14.5	1.22942	1.28058	7.42	0.8701
	18	0.7981	2.176	0.014	327 6.0	21 48.4	62 34.5	4 10.3	1.23110	1.28110	7.36	0.8666
	19	0.8008	2.184	0.014	327 6.4	21 48.4	61 31.7	4 6.1	1.23251	1.28163	7.29	0.8629
	20	0.8036	2.192	0.011	327 5.5	21 48.4	60 29.1	4 1.9	1.23359	1.28219	7.23	0.8591
h (2.0)	21	0.8063	+2.200	+0.006	327 4.8	21 48.3	59 26.6	3 57.8	1.23427	1.28276	+7.16	+0.8551
	22	0.8090	2.208	0.000	327 5.5	21 48.4	58 24.2	3 53.6	1.23458	1.28333	7.09	0.8509
	23	0.8118	2.216	−0.006	327 9.2	21 48.6	57 22.0	3 49.5	1.23456	1.28392	7.02	0.8466
	24	0.8145	2.224	0.012	327 16.7	21 49.1	56 19.8	3 45.3	1.23438	1.28452	6.95	0.8420
	25	0.8172	2.232	0.017	327 28.6	21 49.9	55 17.9	3 41.2	1.23422	1.28512	6.88	0.8373
	26	0.8200	+2.240	−0.018	327 44.4	21 51.0	54 16.0	3 37.1	1.23433	1.28574	+6.80	+0.8324
	27	0.8227	2.249	0.016	328 2.6	21 52.2	53 14.4	3 33.0	1.23489	1.28636	6.72	0.8274
	28	0.8255	2.257	0.011	328 21.3	21 53.4	52 12.8	3 28.9	1.23606	1.28699	6.64	0.8221
	29	0.8282	2.266	−0.004	328 37.9	21 54.5	51 11.4	3 24.8	1.23781	1.28762	6.56	0.8166
	30	0.8309	2.274	+0.004	328 50.5	21 55.4	50 10.1	3 20.7	1.23999	1.28827	6.47	0.8109
	31	0.8337	+2.283	+0.011	328 58.1	21 55.9	49 9.0	3 16.6	1.24230	1.28891	+6.38	+0.8050
Nov.	1	0.8364	2.292	0.015	329 0.9	21 56.1	48 8.1	3 12.5	1.24447	1.28957	6.29	0.7988
	2	0.8392	2.301	0.015	329 0.6	21 56.0	47 7.3	3 8.5	1.24619	1.29022	6.20	0.7925
	3	0.8419	2.310	0.011	328 59.5	21 56.0	46 6.6	3 4.4	1.24735	1.29087	6.11	0.7859
	4	0.8446	2.319	+0.005	329 0.1	21 56.0	45 6.1	3 0.4	1.24793	1.29153	6.01	0.7791
h (3.0)	5	0.8474	+2.328	−0.001	329 4.4	21 56.3	44 5.7	2 56.4	1.24806	1.29219	+5.92	+0.7720
	6	0.8501	2.338	0.007	329 13.4	21 56.9	43 5.5	2 52.4	1.24801	1.29284	5.82	0.7646
	7	0.8528	2.347	0.011	329 27.1	21 57.8	42 5.4	2 48.4	1.24806	1.29349	5.72	0.7570
	8	0.8556	2.357	0.012	329 44.0	21 58.9	41 5.5	2 44.4	1.24845	1.29414	5.61	0.7492
	9	0.8583	2.366	0.009	330 2.4	22 0.2	40 5.7	2 40.4	1.24929	1.29479	5.51	0.7410
	10	0.8610	+2.376	−0.005	330 20.1	22 1.3	39 6.1	2 36.4	1.25063	1.29544	+5.40	+0.7325
	11	0.8638	2.386	+0.001	330 35.4	22 2.4	38 6.7	2 32.4	1.25237	1.29609	5.29	0.7238
	12	0.8665	2.396	0.007	330 47.1	22 3.1	37 7.3	2 28.5	1.25435	1.29672	5.18	0.7147
	13	0.8693	2.406	0.011	330 55.1	22 3.7	36 8.1	2 24.5	1.25638	1.29735	5.07	0.7053
	14	0.8720	2.416	0.013	331 0.0	22 4.0	35 9.1	2 20.6	1.25831	1.29797	4.96	0.6955
	15	0.8747	+2.426	+0.014	331 2.3	22 4.2	34 10.2	2 16.7	1.26003	1.29859	+4.85	+0.6854
	16	0.8775	+2.436	+0.012	331 3.2	22 4.2	33 11.5	2 12.8	1.26144	1.29920	+4.73	+0.6748

FOR WASHINGTON MEAN MIDNIGHT.

Solar Day. (Sidereal Hour.)		r	f	f′	G		H		Log g.	Log h.	i	Log i
			In Time.	In Time.	In Arc.	In Time.	In Arc.	In Time.				
		y	s	s	° ′	h m	° ′	h m			″	
Nov.	16	0.8775	+2.436	+0.012	331 3.2	22 4.2	33 11.5	2 12.8	1.26144	1.29920	+4.73	+0.6748
	17	0.8802	2.447	0.008	331 4.0	22 4.3	32 12.9	2 8.9	1.26249	1.29980	4.61	0.6639
	18	0.8830	2.457	+0.002	331 5.8	22 4.4	31 14.4	2 5.0	1.26319	1.30040	4.49	0.6525
h	19	0.8857	2.468	−0.005	331 10.0	22 4.7	30 16.2	2 1.1	1.26360	1.30097	4.37	0.6407
(4.0)	20	0.8884	2.478	0.011	331 17.6	22 5.2	29 18.0	1 57.2	1.26385	1.30155	4.25	0.6285
	21	0.8912	+2.489	−0.016	331 29.0	22 5.9	28 19.9	1 53.3	1.26411	1.30211	+4.13	+0.6157
	22	0.8939	2.500	0.018	331 44.0	22 6.9	27 22.0	1 49.5	1.26459	1.30265	4.00	0.6024
	23	0.8966	2.511	0.017	332 1.6	22 8.1	26 24.2	1 45.6	1.26550	1.30318	3.88	0.5885
	24	0.8994	2.522	0.013	332 19.8	22 9.3	25 26.6	1 41.8	1.26695	1.30370	3.75	0.5741
	25	0.9021	2.533	−0.006	332 36.4	22 10.4	24 29.0	1 37.9	1.26895	1.30421	3.62	0.5589
	26	0.9049	+2.544	+0.002	332 49.4	22 11.3	23 31.5	1 34.1	1.27138	1.30471	+3.49	+0.5431
	27	0.9076	2.555	0.010	332 57.8	22 11.9	22 34.2	1 30.3	1.27400	1.30518	3.36	0.5266
	28	0.9103	2.567	0.015	333 1.3	22 12.1	21 36.9	1 26.5	1.27651	1.30564	3.23	0.5092
	29	0.9131	2.578	0.016	333 1.5	22 12.1	20 39.8	1 22.7	1.27866	1.30609	3.10	0.4910
	30	0.9158	2.589	0.014	333 0.2	22 12.0	19 42.7	1 18.8	1.28029	1.30652	2.96	0.4718
Dec.	1	0.9186	+2.601	+0.009	332 59.9	22 12.0	18 45.8	1 15.1	1.28137	1.30693	+2.83	+0.4516
	2	0.9213	2.613	+0.002	333 2.5	22 12.2	17 48.9	1 11.3	1.28200	1.30732	2.69	0.4302
	3	0.9240	2.624	−0.005	333 9.4	22 12.6	16 52.1	1 7.5	1.28239	1.30769	2.56	0.4076
h	4	0.9268	2.636	0.010	333 20.5	22 13.4	15 55.3	1 3.7	1.28282	1.30805	2.42	0.3836
(5.0)	5	0.9295	2.648	0.012	333 35.0	22 14.3	14 58.7	0 59.9	1.28353	1.30840	2.28	0.3581
	6	0.9322	+2.660	−0.010	333 51.1	22 15.4	14 2.1	0 56.1	1.28467	1.30873	+2.14	+0.3307
	7	0.9350	2.672	0.006	334 6.6	22 16.4	13 5.5	0 52.4	1.28628	1.30904	2.00	0.3014
	8	0.9377	2.684	−0.001	334 20.0	22 17.3	12 9.1	0 48.6	1.28827	1.30932	1.86	0.2698
	9	0.9404	2.696	+0.005	334 30.4	22 18.0	11 12.7	0 44.8	1.29051	1.30958	1.72	0.2356
	10	0.9432	2.708	0.010	334 37.1	22 18.5	10 16.3	0 41.1	1.29282	1.30982	1.58	0.1983
	11	0.9459	+2.720	+0.013	334 40.5	22 18.7	9 20.0	0 37.3	1.29505	1.31005	+1.44	+0.1574
	12	0.9487	2.732	0.014	334 41.3	22 18.8	8 23.8	0 33.6	1.29708	1.31025	1.29	0.1119
	13	0.9514	2.744	0.012	334 40.6	22 18.7	7 27.6	0 29.8	1.29881	1.31043	1.15	0.0611
	14	0.9541	2.756	0.009	334 39.6	22 18.6	6 31.4	0 26.1	1.30021	1.31059	1.01	0.0033
	15	0.9569	2.769	+0.004	334 39.2	22 18.6	5 35.2	0 22.3	1.30130	1.31073	0.86	9.9364
	16	0.9596	+2.781	−0.003	334 40.7	22 18.7	4 39.1	0 18.6	1.30210	1.31085	+0.72	+9.8572
	17	0.9624	2.793	0.010	334 44.9	22 19.0	3 43.0	0 14.9	1.30272	1.31094	0.58	9.7600
	18	0.9651	2.805	0.015	334 52.5	22 19.5	2 47.0	0 11.1	1.30333	1.31102	0.43	9.6344
	19	0.9678	2.817	0.018	335 3.4	22 20.2	1 50.9	0 7.4	1.30409	1.31108	0.29	9.4569
h	20	0.9706	2.830	0.018	335 16.7	22 21.1	0 54.8	0 3.7	1.30521	1.31111	+0.14	+9.1511
(6.0)	21	0.9733	+2.842	−0.015	335 30.8	22 22.1	359 58.8	23 59.9	1.30678	1.31112	0.00	−7.5012
	22	0.9760	2.854	0.009	335 43.9	22 22.9	359 2.7	23 56.2	1.30887	1.31111	−0.15	9.1702
	23	0.9788	2.866	−0.001	335 54.1	22 23.6	358 6.6	23 52.4	1.31137	1.31107	0.29	9.4665
	24	0.9815	2.879	+0.007	336 0.1	22 24.0	357 10.5	23 48.7	1.31409	1.31101	0.44	9.6409
	25	0.9843	2.891	0.013	336 1.7	22 24.1	356 14.4	23 45.0	1.31676	1.31094	0.58	9.7649
	26	0.9870	+2.903	+0.016	335 59.7	22 24.0	355 18.3	23 41.2	1.31913	1.31084	−0.73	−9.8612
	27	0.9897	2.915	0.015	335 55.9	22 23.7	354 22.1	23 37.5	1.32104	1.31072	0.87	9.9398
	28	0.9925	2.927	0.011	335 52.4	22 23.5	353 25.9	23 33.7	1.32241	1.31058	1.01	0.0062
	29	0.9952	2.940	+0.005	335 51.1	22 23.4	352 29.6	23 30.0	1.32335	1.31042	1.16	0.0637
	30	0.9980	2.952	−0.002	335 53.5	22 23.6	351 33.3	23 26.2	1.32400	1.31023	1.30	0.1144
	31	1.0007	+2.964	−0.008	335 59.8	22 24.0	350 36.9	23 22.5	1.32460	1.31003	−1.44	−0.1596
	32	1.0034	+2.976	−0.011	336 9.4	22 24.6	349 40.5	23 18.7	1.32540	1.30981	−1.59	−0.200

BESSELIAN AND INDEPENDENT STAR-NUMBERS.

FOR WASHINGTON SIDEREAL TWELVE HOURS.

Mean Solar Date.	Log *A′*.	Log *B′*.	Log *C*.	Log *D*.	*f*	*G′*	*H*	Log *g′*.	Log *h*.	Log *i*.
1912.					s	° ′	° ′			
Jan. 0.72	−9.1605	−0.8820	−0.4989	+1.3049	−0.446	249 10	351 7	0.9114	1.3101	−0.1362
10.70	9.0270	0.8896	0.8043	1.2846	0.328	254 37	341 41	0.9054	1.3071	0.4416
20.67	8.8461	0.8999	0.9725	1.2487	0.217	259 58	332 6	0.9066	1.3023	0.6098
30.64	8.5638	0.9118	1.0829	1.1946	0.114	264 52	322 17	0.9135	1.2963	0.7202
Feb. 9.61	−7.7945	0.9238	1.1593	1.1170	−0.020	269 9	312 13	0.9239	1.2897	0.7966
19.59	+8.3237	−0.9348	−1.2126	+1.0060	+0.064	272 48	301 52	0.9353	1.2835	−0.8499
29.56	8.6599	0.9437	1.2476	0.8381	0.139	275 57	291 17	0.9461	1.2782	0.8849
Mar. 10.53	8.8351	0.9499	1.2674	+0.5370	0.209	278 45	280 32	0.9550	1.2748	0.9047
20.50	8.9548	0.9530	1.2737	−8.9372	0.276	281 23	269 44	0.9616	1.2737	0.9110
30.48	9.0486	0.9528	1.2669	0.5556	0.343	284 2	259 0	0.9659	1.2749	0.9042
Apr. 9.45	+9.1291	−0.9497	−1.2469	−0.8436	+0.412	286 51	248 26	0.9688	1.2784	−0.8842
19.42	9.2021	0.9442	1.2126	1.0059	0.488	289 57	238 9	0.9711	1.2835	0.8499
29.40	9.2703	0.9371	1.1618	1.1136	0.571	293 21	228 10	0.9742	1.2895	0.7991
May 9.37	9.3347	0.9294	1.0902	1.1892	0.663	297 1	218 32	0.9796	1.2958	0.7275
19.34	9.3956	0.9220	0.9898	1.2426	0.763	300 49	209 12	0.9881	1.3016	0.6271
29.31	+9.4525	−0.9160	−0.8428	−1.2790	+0.870	304 35	200 7	1.0004	1.3063	−0.4801
June 8.29	9.5053	0.9122	0.5993	1.3012	0.983	308 9	191 14	1.0165	1.3096	0.2366
18.26	9.5537	0.9112	−9.9460	1.3106	1.099	311 21	182 28	1.0358	1.3110	−9.5833
28.23	9.5974	0.9132	+0.3481	1.3080	1.215	314 6	173 44	1.0570	1.3106	+9.9854
July 8.20	9.6365	0.9182	0.7225	1.2932	1.330	316 20	164 58	1.0791	1.3084	0.3598
18.18	+9.6710	−0.9256	+0.9130	−1.2654	+1.440	318 7	156 3	1.1012	1.3045	+0.5503
28.15	9.7013	0.9347	1.0362	1.2226	1.544	319 30	146 56	1.1222	1.2993	0.6735
Aug. 7.12	9.7275	0.9446	1.1225	1.1613	1.640	320 34	137 33	1.1416	1.2933	0.7598
17.10	9.7502	0.9542	1.1843	1.0752	1.728	321 24	127 53	1.1592	1.2870	0.8216
27.07	9.7698	0.9628	1.2277	0.9514	1.808	322 7	117 54	1.1746	1.2813	0.8650
Sept. 6.04	+9.7871	−0.9694	+1.2560	−0.7578	+1.881	322 48	107 37	1.1879	1.2768	+0.8933
16.01	9.8027	0.9736	1.2708	−0.3674	1.950	323 31	97 7	1.1994	1.2742	0.9081
25.99	9.8173	0.9749	1.2730	+0.0611	2.017	324 21	86 29	1.2095	1.2738	0.9103
Oct. 5.96	9.8317	0.9733	1.2623	0.6645	2.085	325 21	75 50	1.2185	1.2757	0.8996
15.93	9.8464	0.9690	1.2380	0.9014	2.157	326 31	65 16	1.2273	1.2798	0.8753
25.90	+9.8620	−0.9624	+1.1981	+1.0453	+2.235	327 51	54 52	1.2363	1.2854	+0.8354
Nov. 4.88	9.8786	0.9543	1.1391	1.1434	2.322	329 18	44 43	1.2462	1.2918	0.7764
14.85	9.8963	0.9457	1.0547	1.2126	2.419	330 48	34 48	1.2574	1.2982	0.6920
24.82	9.9150	0.9377	0.9319	1.2607	2.526	332 16	25 8	1.2700	1.3039	0.5692
Dec. 4.80	9.9342	0.9316	0.7389	1.2918	2.640	333 37	15 38	1.2839	1.3082	0.3762
14.77	+9.9534	−0.9283	+0.3491	+1.3080	+2.760	334 47	6 16	1.2989	1.3106	+9.9864
24.74	9.9722	0.9283	−0.0370	1.3104	2.881	335 44	356 57	1.3144	1.3110	−9.6743
34.71	+9.9900	−0.9318	−0.6415	+1.2990	+3.003	336 26	347 35	1.3299	1.3092	−0.2788

$$E = -0^{s}.001$$

The above numbers give the same reductions from mean to apparent place as are employed in computing the apparent places of the fixed stars, given on pages 287 to 486, from the mean places, given on pages 233 to 250. In order to render exact interpolation possible through intervals of ten days, all short period terms have been omitted.

TERMS OF SHORT PERIOD IN THE NUTATION, 1912.

FOR WASHINGTON MEAN MIDNIGHT.

Date.	δ″ψ	δ″ω	Date.	δ″ψ	δ″ω	Date.	δ″ψ	δ″ω	Date.	δ″ψ	δ″ω
	″	″		″	″		″	″		″	″
Jan. 0	−0.30	−0.03	Feb. 15	+0.19	−0.05	Apr. 1	−0.06	+0.09	May 17	−0.16	−0.09
1	0.22	0.08	16	0.20	0.00	2	0.14	0.06	18	−0.04	0.11
2	−0.10	0.11	17	0.17	+0.04	3	0.17	+0.02	19	+0.10	0.10
3	+0.05	0.11	18	0.11	0.08	4	0.17	−0.03	20	0.21	0.07
4	0.18	0.08	19	+0.01	0.10	5	0.12	0.07	21	0.27	−0.02
5	0.27	−0.04	20	−0.10	0.10	6	−0.05	0.09	22	0.28	+0.03
6	0.30	+0.01	21	0.21	0.09	7	+0.03	0.10	23	0.22	0.08
7	0.27	0.06	22	0.28	+0.05	8	0.11	0.09	24	0.12	0.10
8	0.19	0.09	23	0.31	0.00	9	0.17	0.07	25	+0.01	0.11
9	+0.08	0.11	24	0.28	−0.05	10	0.20	−0.03	26	−0.09	0.09
10	−0.02	+0.09	25	−0.19	−0.09	11	+0.20	+0.01	27	−0.16	+0.05
11	0.11	0.06	26	−0.07	0.11	12	0.15	0.05	28	0.18	0.00
12	0.15	+0.02	27	+0.07	0.10	13	+0.08	0.09	29	0.16	−0.04
13	0.16	−0.02	28	0.18	0.07	14	−0.02	0.10	30	0.10	0.08
14	0.12	0.06	29	0.25	−0.02	15	0.13	0.10	31	−0.02	0.10
15	−0.06	0.09	Mar. 1	0.26	+0.03	16	0.22	0.08	June 1	+0.06	0.10
16	+0.01	0.10	2	0.21	0.08	17	0.28	+0.03	2	0.13	0.08
17	0.09	0.09	3	0.12	0.10	18	0.28	−0.02	3	0.18	0.05
18	0.15	0.07	4	+0.02	0.11	19	0.23	0.07	4	0.20	−0.01
19	0.19	−0.03	5	−0.07	0.09	20	−0.13	0.10	5	0.17	+0.03
20	+0.19	+0.01	6	−0.14	+0.05	21	0.00	−0.11	6	+0.11	+0.07
21	0.15	0.05	7	0.16	0.00	22	+0.13	0.09	7	+0.02	0.09
22	+0.07	0.09	8	0.15	−0.04	23	0.23	−0.06	8	−0.08	0.10
23	−0.03	0.10	9	0.09	0.07	24	0.27	0.00	9	0.19	0.09
24	0.15	0.10	10	−0.02	0.10	25	0.25	+0.05	10	0.27	0.06
25	0.25	0.08	11	+0.06	0.10	26	0.18	0.09	11	0.31	+0.02
26	0.31	+0.04	12	0.13	0.08	27	+0.07	0.11	12	0.29	−0.04
27	0.32	−0.02	13	0.18	0.06	28	−0.03	0.10	13	0.21	0.08
28	0.26	0.07	14	0.20	−0.02	29	0.12	0.07	14	−0.09	0.11
29	0.16	0.10	15	0.19	+0.03	30	0.17	+0.03	15	+0.05	0.11
30	−0.02	−0.11	16	+0.14	+0.07	May 1	−0.18	−0.01	16	+0.17	−0.08
31	+0.12	0.09	17	+0.05	0.09	2	0.15	0.06	17	0.26	−0.04
Feb. 1	0.22	0.06	18	−0.05	0.11	3	−0.08	0.09	18	0.29	+0.01
2	0.27	−0.01	19	0.16	0.10	4	0.00	0.10	19	0.26	0.06
3	0.27	+0.05	20	0.25	0.06	5	+0.08	0.09	20	0.17	0.10
4	0.20	0.09	21	0.29	+0.02	6	0.15	0.07	21	+0.06	0.11
5	+0.11	0.11	22	0.28	−0.03	7	0.19	−0.04	22	−0.05	0.09
6	0.00	0.10	23	0.21	0.08	8	0.20	0.00	23	0.13	0.06
7	−0.09	0.08	24	−0.10	0.11	9	0.16	+0.04	24	0.17	+0.02
8	0.14	+0.04	25	+0.03	0.11	10	+0.09	0.08	25	0.16	−0.03
9	−0.16	−0.01	26	+0.15	−0.08	11	0.00	+0.10	26	−0.11	−0.07
10	0.13	0.05	27	0.23	−0.04	12	−0.11	0.10	27	−0.04	0.10
11	−0.07	0.08	28	0.26	+0.01	13	0.21	0.09	28	+0.04	0.10
12	0.00	0.10	29	0.22	0.06	14	0.28	+0.05	29	0.12	0.09
13	+0.08	0.10	30	0.14	0.10	15	0.29	0.00	30	0.18	0.06
14	0.14	0.08	31	+0.04	0.11	16	0.26	−0.05	July 1	0.20	−0.02
15	+0.19	−0.05	Apr. 1	−0.06	+0.09	17	−0.16	−0.09	2	+0.19	+0.02

TERMS OF SHORT PERIOD IN THE NUTATION, 1912.

FOR WASHINGTON MEAN MIDNIGHT.

Date.	$\delta''\psi$	$\delta''\omega$	Date.	$\delta''\psi$	$\delta''\omega$	Date.	$\delta''\psi$	$\delta''\omega$	Date.	$\delta''\psi$	$\delta''\omega$
	″	″		″	″		″	″		″	″
July 1	+0.20	−0.02	Aug. 16	−0.08	+0.09	Oct. 1	−0.15	−0.10	Nov. 16	+0.19	+0.04
2	0.19	+0.02	17	0.14	+0.05	2	−0.03	0.11	17	0.12	0.07
3	0.14	0.06	18	0.15	0.00	3	+0.09	0.09	18	+0.03	0.10
4	+0.06	0.09	19	0.13	−0.05	4	0.19	−0.06	19	−0.08	0.10
5	−0.05	0.10	20	−0.06	0.08	5	0.23	0.00	20	0.18	0.09
6	0.16	0.10	21	+0.02	0.10	6	0.22	+0.05	21	0.26	0.06
7	0.26	0.07	22	0.10	0.10	7	0.15	0.09	22	0.30	+0.01
8	0.31	+0.03	23	0.17	0.08	8	+0.05	0.11	23	0.28	−0.04
9	0.32	−0.02	24	0.21	0.05	9	−0.05	0.10	24	0.21	0.08
10	0.26	0.07	25	0.22	−0.01	10	0.13	0.07	25	−0.10	0.11
11	−0.16	−0.10	26	+0.20	+0.03	11	−0.18	+0.03	26	+0.04	−0.11
12	−0.02	0.11	27	0.13	0.07	12	0.17	−0.02	27	0.16	0.08
13	+0.12	0.09	28	+0.04	0.10	13	0.12	0.06	28	0.24	−0.04
14	0.22	−0.06	29	−0.07	0.10	14	−0.04	0.09	29	0.26	+0.02
15	0.27	0.00	30	0.18	0.09	15	+0.05	0.10	30	0.23	0.07
16	0.27	+0.05	31	0.27	0.06	16	0.14	0.09	Dec. 1	0.14	0.10
17	0.20	0.09	Sept. 1	0.31	+0.01	17	0.20	0.07	2	+0.03	0.11
18	+0.10	0.11	2	0.30	−0.04	18	0.23	−0.03	3	−0.08	0.10
19	−0.01	0.10	3	0.24	0.08	19	0.22	+0.01	4	0.16	0.06
20	0.10	0.07	4	−0.13	0.11	20	0.18	0.05	5	0.19	+0.01
21	−0.15	+0.03	5	0.00	−0.11	21	+0.10	+0.08	6	−0.17	−0.04
22	0.16	−0.02	6	+0.12	0.08	22	0.00	0.10	7	0.11	0.08
23	0.12	0.06	7	0.21	−0.04	23	−0.11	0.10	8	−0.02	0.10
24	−0.05	0.09	8	0.24	+0.01	24	0.20	0.08	9	+0.08	0.10
25	+0.03	0.10	9	0.21	0.06	25	0.27	+0.04	10	0.16	0.08
26	0.11	0.09	10	0.14	0.10	26	0.29	−0.01	11	0.21	0.05
27	0.17	0.07	11	+0.03	0.11	27	0.26	0.05	12	0.23	−0.01
28	0.21	−0.04	12	−0.06	0.10	28	0.18	0.09	13	0.20	+0.03
29	0.21	+0.01	13	0.14	0.06	29	−0.06	0.11	14	0.14	0.07
30	0.17	0.05	14	0.16	+0.01	30	+0.07	0.10	15	+0.05	0.09
31	+0.09	+0.08	15	−0.15	−0.03	31	+0.18	−0.07	16	−0.05	+0.10
Aug. 1	−0.01	0.10	16	0.09	0.07	Nov. 1	0.24	−0.02	17	0.16	0.09
2	0.12	0.10	17	−0.01	0.10	2	0.24	+0.03	18	0.25	0.07
3	0.23	0.08	18	+0.08	0.10	3	0.19	0.08	19	0.30	+0.02
4	0.30	+0.05	19	0.16	0.09	4	+0.09	0.11	20	0.30	−0.02
5	0.33	0.00	20	0.21	0.06	5	−0.02	0.11	21	0.25	0.07
6	0.29	−0.05	21	0.23	−0.02	6	0.12	0.09	22	0.15	0.10
7	0.21	0.09	22	0.21	+0.02	7	0.18	+0.04	23	−0.02	0.11
8	−0.08	0.11	23	0.16	0.06	8	0.19	−0.01	24	+0.11	0.09
9	+0.05	0.10	24	+0.07	0.09	9	0.15	0.05	25	0.22	−0.06
10	+0.17	−0.07	25	−0.03	+0.10	10	−0.08	−0.09	26	+0.27	0.00
11	0.24	−0.02	26	0.14	0.10	11	+0.01	0.10	27	0.25	+0.05
12	0.26	+0.03	27	0.23	0.07	12	0.10	0.10	28	0.18	0.09
13	0.21	0.08	28	0.29	+0.03	13	0.18	0.08	29	+0.08	0.11
14	0.12	0.11	29	0.30	−0.02	14	0.22	−0.04	30	−0.03	0.10
15	+0.02	0.11	30	0.25	0.07	15	0.23	0.00	31	0.12	0.07
16	−0.08	+0.09	Oct. 1	−0.15	−0.10	16	+0.19	+0.04	32	−0.17	+0.02

WASHINGTON, JANUARY $1^{d}.006$.

Name of Star.	Magnitude.	Right Ascension.	Annual Variation.	Declination.	Annual Variation.
		h m s	s	° ′ ″	″
33 Piscium . . .	4.7	0 0 49.898	+ 3.0715	− 6 11 59.45	+20.136
α Andromedæ (*Alpheratz*)	2.2	0 3 50.162	3.0955	+28 36 16.59	19.880
β Cassiopeiæ . .	2.4	0 4 28.504	3.1834	+58 39 51.97	19.862
ε Phœnicis . . .	3.9	0 4 56.832	3.0520	−46 13 58.96	19.848
22 Andromedæ . .	5.1	0 5 44.571	3.1088	+45 34 57.27	20.035
γ Pegasi . . .	2.9	0 8 42.161	+ 3.0861	+14 41 39.75	+20.021
σ Andromedæ . .	4.5	0 13 43.613	3.1269	+36 17 50.52	19.963
ι Ceti . . .	3.8	0 14 56.674	3.0570	− 9 18 42.04	19.974
ζ Tucanæ . . .	4.3	0 15 29.743	3.1497	−65 23 29.80	21.172
44 Piscium . . .	6.0	0 20 53.464	3.0742	+ 1 27 8.50	19.939
β Hydri . . .	2.9	0 21 8.620	+ 3.2043	−77 44 59.48	+20.279
α Phœnicis . . .	2.4	0 21 56.254	2.9731	−42 47 1.95	19.551
12 Ceti . . .	6.0	0 25 32.885	3.0621	− 4 26 36.25	19.921
13 Ceti . . . †	5.2	0 30 43.080	3.0871	− 4 4 37.57	19.849
ζ Cassiopeiæ . .	3.7	0 32 3.748	3.3272	+53 24 45.87	19.843
π Andromedæ . .	4.4	0 32 10.631	+ 3.1970	+33 14 6.22	+19.849
ε Andromedæ . .	4.5	0 33 54.131	3.1638	+28 50 2.68	19.573
δ Andromedæ . .	3.5	0 34 37.138	3.2014	+30 22 45.98	19.721
α Cassiop. (*Schedir*) . †	*var.*	0 35 30.339	3.3852	+56 3 17.55	19.774
μ Phœnicis . . .	4.6	0 37 10.086	2.8400	−46 34 5.92	19.751
β Ceti . . .	2.2	0 39 10.381	+ 3.0126	−18 28 9.82	+19.795
ο Cassiopeiæ . .	4.7	0 39 48.961	3.3302	+47 48 10.61	19.738
21 Cassiopeiæ . .	5.6	0 39 48.984	3.9010	+74 30 26.07	19.718
ζ Andromedæ . .	4.3	0 42 40.273	3.1742	+23 47 19.04	19.622
η Cassiopeiæ . . †	3.6	0 43 46.125	3.6116	+57 20 59.54	19.205
δ Piscium . . .	4.6	0 44 6.921	+ 3.1099	+ 7 6 22.84	+19.631
λ Hydri . . .	5.0	0 45 32.752	2.1021	−75 24 7.82	19.650
20 Ceti . . .	4.9	0 48 30.554	3.0641	− 1 37 18.43	19.595
γ Cassiopeiæ . .	2.2	0 51 23.243	3.5958	+60 14 25.56	19.539
μ Andromedæ . .	3.9	0 51 51.855	3.3202	+38 1 19.99	19.565
α Sculptoris . .	4.4	0 54 21.918	+ 2.8908	−29 49 59.04	+19.472
43 H. Cephei . .	4.5	0 56 31.244	7.5725	+85 47 8.15	19.435
ε Piscium . . .	4.4	0 58 22.474	3.1110	+ 7 24 59.64	19.425
β Phœnicis . . . †	3.4	1 2 9.407	2.6803	−47 11 24.48	19.288
μ Cassiopeiæ . .	5.3	1 2 24.358	3.9678	+54 29 21.00	17.752
η Ceti . . .	3.6	1 4 9.775	+ 3.0175	−10 38 54.34	+19.140
β Andromedæ . .	2.4	1 4 48.009	3.3499	+35 9 15.21	19.133
τ Piscium . . .	4.7	1 6 48.605	3.2965	+29 37 21.71	19.172
ζ Piscium . . . †	5.6	1 9 7.938	3.1316	+ 7 6 36.94	19.089
κ Tucanæ . . . †	5.0	1 12 47.111	2.0401	−69 20 36.92	19.132
f Piscium . . .	5 3	1 13 15.525	+ 3.0924	+ 3 9 4.65	+19.005
υ Piscium . . .	4.7	1 14 37.566	3.2901	+26 48 6.47	18.985
θ Ceti . . .	3.8	1 19 37.455	2.9977	− 8 38 13.83	18.633
δ Cassiopeiæ . .	2.8	1 20 2.942	3.8983	+59 46 42.30	18.799
γ Phœnicis . . .	3.4	1 24 32.676	2.6081	−43 46 8.58	18.472
38 Cassiopeiæ . .	6.0	1 24 39.740	+ 4.4111	+69 48 43.86	+18.622
η Piscium . . .	3.7	1 26 46.307	3.2054	+14 53 32.97	18.623
α Ursæ Min. (*Polaris*) . †	2.1	1 27 51.07*	+27.8225	+88 50 10.77	+18.594

13 **Ceti, dup.** $5^{m}.5$, $6^{m}.2$, 0″.3
α **Cassiop., var. irreg.** $2^{m}.2$, $2^{m}.8$
η **Cassiop. comp.** $7^{m}.6$, 5″ **s. pr.**

β Phœnicis, dup. $4^{m}.1$, $4^{m}.1$, 1″.
ζ Piscium, star $6^{m}.5$, 24″ n.f.

κ Tucanæ, comp. 7^{m}, 6″
α Ursæ Min. star 9^{m},

MEAN PLACES OF STARS, 1912.

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Name of Star.	Magnitude.	Right Ascension.			Annual Variation.	Declination.			Ar Var
		h	m	s	s	°	′	″	
40 Cassiopeiæ . .	5.5	1	31	27.647	+4.7276	+72	35	31.38	+1
υ Andromedæ . .	4.2	1	31	37.598	3.5089	+40	57	56.46	1
π Piscium . . .	5.6	1	32	25.868	3.1762	+11	41	30.01	1
υ Persei . . .	3.8	1	32	35.019	3.6661	+48	10	57.73	1
α Eridani (*Achernar*) .	0.6	1	34	26.269	2.2368	−57	41	1.28	1
ω Cassiopeiæ . .	5.5	1	35	48.406	+4.3975	+67	35	54.26	+1
ν Piscium . . .	4.7	1	36	51.019	3.1194	+ 5	2	33.55	1
ϕ Persei . . .	4.2	1	38	8.243	3.7428	+50	14	45.03	1
τ Ceti . . .	3.6	1	39	58.762	2.7865	−16	24	1.94	1
ο Piscium . . .	4.5	1	40	44.692	3.1646	+ 8	42	54.56	1
ε Sculptoris . . . †	5.4	1	41	31.268	+2.8046	−25	29	31.10	+1
4 Octantis (G.) . .	5.6	1	42	21.27*	−3.8135	−85	12	52.03	1
ζ Ceti . . .	3.9	1	47	6.983	+2.9600	−10	46	9.75	1
ε Cassiopeiæ . .	3.4	1	48	3.067	4.2814	+63	14	14.02	1
α Trianguli . . .	3.6	1	48	3.679	3.4126	+29	9	2.01	1
ξ Piscium . . .	4.8	1	48	59.904	+3.1035	+ 2	45	12.57	+1
β Arietis . . .	2.7	1	49	46.516	3.3078	+20	22	41.68	1
ψ Phœnicis . . .	4.4	1	50	6.983	2.4039	−46	44	1.20	1
υ Ceti . . .	4.2	1	55	51.489	2.8258	−21	30	13.75	1
50 Cassiopeiæ . .	4.1	1	55	53.726	5.0553	+71	59	45.76	1
α Hydri . . .	3.0	1	55	59.435	+1.8819	−61	59	52.16	+1
γ Andromedæ *pr.* .	2.3	1	58	29.508	3.6700	+41	54	28.62	1
γ Andromedæ *seq.* .	5.1	Δ α + 0.889			. . .	Δ δ + 4.67			.
α Arietis . . .	2.2	2	2	12.549	3.3755	+23	2	48.43	1
β Trianguli . . .	3.1	2	4	18.159	3.5606	+34	34	17.39	1
55 Cassiopeiæ . .	6.2	2	7	33.612	+4.6647	+66	6	45.23	+1
6 Persei . . .	5.4	2	7	44.691	3.9717	+50	39	27.08	1
ξ¹ Ceti . . .	4.5	2	8	20.025	3.1766	+ 8	26	3.28	1
μ Fornacis . . .	5.2	2	9	1.718	2.6379	−31	8	11.66	1
γ Trianguli . . .	4.1	2	12	4.699	3.5575	+33	26	26.48	1
67 Ceti . . .	5.7	2	12	35.580	+2.9905	− 6	49	38.37	+1
ϕ Eridani . . .	3.8	2	13	21.849	2.1413	−51	55	9.44	1
ο Ceti (*Mira*) . . †	*var.*	2	14	54.005	3.0290	− 3	22	36.02	1
κ Fornacis . . .	5.4	2	18	30.922	2.7448	−24	12	57.36	1
δ Hydri . . .	4.3	2	20	10.726	1.0575	−69	3	34.63	1
ι Cassiopeiæ . . †	4.6	2	21	47.998	+4.8990	+67	0	26.85	+1
ξ² Ceti . . .	4.3	2	23	28.685	3.1861	+ 8	3	58.04	1
σ Ceti . . .	4.8	2	27	54.909	2.8414	−15	37	48.98	1
36 H. Cassiopeiæ . .	5.3	2	29	38.442	5.6321	+72	26	3.06	1
ν Ceti . . .	5.0	2	31	15.241	+3.1448	+ 5	12	35.30	1
μ Hydri . . .	5.3	2	33	30.481	−1.3585	−79	29	36.51	+1
ν Arietis . . .	5.4	2	33	48.998	+3.4014	+21	34	52.95	1
δ Ceti . . .	4.0	2	34	58.242	3.0729	− 0	3	1.91	1
θ Persei . . .	4.2	2	38	10.945	4.0818	+48	51	24.95	1
ε Hydri . . .	4.3	2	38	13.894	0.9128	−68	38	38.03	1
γ Ceti *seq.* . . . †	3.7	2	38	44.347	+3.1056	+ 2	51	55.62	+1
π Ceti . . .	4.4	2	39	56.000	2.8536	−14	13	51.22	1
μ Ceti . . .	4.4	2	40	10.957	+3.2390	+ 9	44	35.52	+1

ε Sculptoris, comp. 9^{m}, 5″ n.f.
ο Ceti, var., 331^{d}, $1^{m}.7$–$9^{m}.6$, star 9^{m} f. 8^{s}

ι Cassiop., triple, 7^{m}, 8^{m}, 2″, 8″

γ Ceti, comp., $6^{m}.2$, 2″.7

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Name of Star.	Magnitude.	Right Ascension.	Annual Variation.	Declination.	Annual Variation.
		h m s	s	° ′ ″	″
sei . . . †	3.9	2 44 16.158	+4.3555	+55 31 51.65	+15.102
etis . . .	3.7	2 44 48.008	3.5241	+26 53 54.34	14.971
nacis . . .	4.5	2 45 24.456	2.5121	−32 46 30.54	15.203
etis . . .	5.5	2 46 37.888	3.3076	+14 43 11.64	14.943
dani . . .	4.8	2 47 2.733	2.7200	−21 21 58.26	14.936
sei . . .	4.1	2 48 0.630	+4.2347	+52 24 11.03	+14.893
dani . . .	4.0	2 52 7.678	2.9300	− 9 14 52.26	14.440
etis (*mean*) . . †	4.6	2 54 10.609	3.4248	+20 59 20.11	14.520
Cephei . . .	5.7	2 54 20.380	7.8344	+79 4 19.97	14.530
dani . . . †	3.4	2 54 55.581	2.2767	−40 39 24.85	14.509
i . . .	2.8	2 57 40.657	+3.1329	+ 3 44 42.15	+14.239
sei . . .	3.1	2 58 24.898	4.3262	+53 9 45.46	14.268
dani . . .	4.2	2 58 30.721	2.6448	−23 58 7.83	14.223
sei . . . †	*var.*	2 59 31.942	3.8343	+38 29 59.55	14.088
ologii . . .	5.2	3 1 32.139	1.4073	−60 4 42.98	14.025
dri . . .	5.5	3 2 3.825	+0.0980	−72 14 45.99	+14.060
sei (*Algol*) . . †	*var.*	3 2 26.258	3.8924	+40 37 2.37	14.021
tis . . .	4.5	3 6 35.658	3.4256	+19 23 40.43	13.762
lani . . . †	4.0	3 8 19.922	2.5466	−29 20 0.85	14.286
Cephei . . .	5.5	3 9 6.868	7.4899	+77 24 45.80	13.545
tis . . .	5.0	3 9 50.413	+3.4431	+20 43 7.95	+13.471
ologii (G.) . . †	5.7	3 10 19.219	1.5145	−57 39 3.16	13.516
lani . . .	4.9	3 11 33.466	2.9122	− 9 8 45.57	13.495
tis . . .	5.2	3 16 8.632	3.4588	+20 49 49.49	13.109
lani . . .	4.3	3 16 24.766	2.3980	−43 24 20.98	13.882
ei (*Algenib*) .	1.9	3 18 1.991	+4.2676	+49 32 55.57	+12.988
dri . . .	5.5	3 18 7.808	−1.5592	−77 42 36.94	13.050
ri . . .	3.8	3 20 4.537	+3.2250	+ 8 43 11.34	12.806
amelopardalis .	4.4	3 21 56.055	4.8349	+59 38 4.42	12.756
ri . . .	3.8	3 22 23.886	3.2480	+ 9 25 34.96	12.677
ri . . .	4.3	3 26 0.759	+3.3086	+12 38 8.76	+12.480
lani . . . †	3.8	3 28 47.015	2.8250	− 9 45 19.74	12.313
lani . . .	4.3	3 29 53.960	2.6482	−21 55 39.25	12.171
ei . . .	3.1	3 36 39.206	4.2587	+47 30 25.24	11.700
lani . . .	3.7	3 39 1.929	2.8728	−10 3 39.01	12.298
ei . . .	3.9	3 39 12.644	+4.0659	+42 18 5.23	+11.554
amelopardalis .	4.7	3 41 3.045	6.2792	+71 3 43.80	11.366
ri (*Alcyone*) . †	3.0	3 42 15.035	3.5611	+23 50 1.34	11.286
lani . . .	4.3	3 43 3.692	2.5805	−23 30 30.63	10.796
lani . . .	4.2	3 46 9.698	+2.2450	−36 27 57.97	11.024
dri . . .	3.2	3 48 35.343	−0.9684	−74 30 31.91	+10.992
ei . . .	2.9	3 48 35.809	+3.7649	+31 37 22.99	10.860
amelopardalis . †	5.2	3 49 37.466	5.0917	+60 51 7.31	10.781
ei . . . †	3.0	3 51 56.690	4.0183	+39 45 23.29	10.600
ei . . .	4.0	3 53 15.096	3.8861	+35 32 19.16	10.512
lani . . .	3.2	3 53 55.397	+2.7983	−13 45 29.73	+10.369
ri . . . †	*var.*	3 55 48.195	3.3212	+12 14 32.60	10.328
iculi . . .	4.4	3 57 20.864	+0.9402	−61 38 53.46	+10.221

i, star $8^{m}.5$, 28″ n. pr.
s, dup., $5^{m}.2$, $5^{m}.6$, 1″.2
ai, comp. $4^{m}.4$, f. 8″
, var. irreg., $3^{m}.4$–$4^{m}.2$

β Persei, var. $2^{d}.87$, $2^{m}.1$–$3^{m}.2$
12 Eridani, comp. 7^{m}, .4 n. pr.
38 Horologii remarkable purplish red star.
ε Eridani, comp. 9^{m}, s. 7″

η Tauri, quad., comps. $6^{m}.3$, $7^{m}.6$, $8^{m}.2$, 117″, 181″, 190″
9 H. Camelop., comp. 8^{m}, 1″.9 n.f.
ε Persei, comp. 8^{m}, 8″.6 n.f.
λ Tauri, var., $3^{d}.95$, $3^{m}.3$–$4^{m}.2$

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Name of Star.	Magnitude.	Right Ascension.	Annual Variation.	Declination.	Annual Variation.
		h m s	s	° ′ ″	″
ν Tauri	3.9	3 58 28.433	+ 3.1894	+ 5 44 44.90	+10.133
A Tauri †	4.5	3 59 29.423	3.5428	+21 50 32.00	10.003
c Persei	4.0	4 2 16.110	4.3460	+47 28 42.36	9.819
p Tauri	5.6	4 5 28.132	3.6487	+26 15 7.32	9.564
o^1 Eridani	4.1	4 7 34.152	2.9271	− 7 3 58.86	9.530
Groombridge 750	6.7	4 8 34.697	+17.5285	+85 19 23.58	+ 9.409
μ Tauri	4.3	4 10 45.266	3.2553	+ 8 40 21.58	9.173
α Horologii	3.8	4 11 5.135	1.9873	−42 30 40.38	8.941
α Reticuli	3.4	4 13 17.247	0.7643	−62 41 38.21	9.044
γ Tauri	3.9	4 14 47.020	3.4112	+15 24 57.09	8.857
δ Tauri	3.9	4 17 51.471	+ 3.4565	+17 20 12.71	+ 8.611
υ^5 Eridani	4.1	4 20 43.874	2.2527	−34 13 14.82	8.456
ε Tauri	3.6	4 23 28.583	+ 3.5003	+18 59 9.68	8.161
δ Mensæ	5.6	4 23 53.726	− 4.1559	−80 25 15.04	8.234
m Persei †	6.1	4 27 13.181	+ 4.2143	+42 52 36.57	7.899
α Tauri (*Aldebaran*)	1.1	4 30 52.159	+ 3.4397	+16 19 59.31	+ 7.412
ν Eridani	4.1	4 31 55.253	2.9956	− 3 31 53.95	7.516
α Doradus	3.5	4 32 5.636	1.2944	−55 13 36.30	7.490
53 Eridani	4.0	4 34 8.919	2.7454	−14 28 31.[illegible]7	7.181
τ Tauri	4.3	4 36 57.699	3.5983	+22 47 19.97	7.086
Groombridge 848	6.0	4 36 58.270	+ 8.0144	+75 46 57.50	+ 6.960
α Cœli	4.5	4 37 43.476	1.9299	−42 1 53.94	6.936
4 Camelopardalis	5.4	4 40 40.078	4.9854	+56 36 7.16	6.653
μ Eridani	4.2	4 41 6.098	2.9986	− 3 24 54.83	6.756
π^3 Orionis	3.3	4 45 3.706	3.2549	+ 6 48 30.50	6.462
9 Camelopardalis	4.4	4 45 17.698	+ 5.9461	+66 11 40.25	+ 6.424
i Tauri	5.1	4 46 13.473	3.5073	+18 41 27.14	6.307
π^5 Orionis	3.9	4 49 40.009	3.1238	+ 2 17 50.56	6.061
ι Aurigæ	2.9	4 51 15.637	3.9034	+33 1 39.46	5.901
β Camelopardalis	4.2	4 55 35.048	5.3245	+60 18 53.44	5.549
ε Aurigæ †	*var.*	4 55 39.115	+ 4.3006	+43 41 38.48	+ 5.542
ζ Aurigæ	3.9	4 56 19.455	4.1890	+40 56 54.13	5.476
ι Tauri	4.7	4 57 50.083	3.5844	+21 27 53.89	5.322
11 Orionis	4.6	4 59 32.370	3.4264	+15 16 56.41	5.191
η Aurigæ	3.3	5 0 20.505	4.2036	+41 6 58.96	5.088
ε Leporis	3.3	5 1 44.120	+ 2.5383	−22 29 19.08	+ 4.978
β Eridani	2.9	5 3 31.401	2.9490	− 5 11 58.05	4.816
μ Aurigæ	4.8	5 7 24.233	4.1013	+38 22 52.18	4.480
19 H. Camelopardalis	5.2	5 8 2.021	9.8275	+79 7 56.09	4.662
μ Leporis	3.3	5 8 58.691	2.6939	−16 18 32.40	4.398
α Aurigæ (*Capella*)	0.2	5 10 11.163	+ 4.4283	+45 54 34.28	+ 3.894
β Orionis (*Rigel*) †	0.3	5 10 18.480	2.8822	− 8 18 9.36	4.312
λ Aurigæ	4.8	5 12 56.933	4.2173	+40 1 18.56	3.427
τ Orionis	3.7	5 13 19.989	2.9124	− 6 56 19.66	4.049
o Columbæ	4.9	5 14 18.499	2.1587	−34 58 51.40	3.618
γ Orionis (*Bellatrix*)	1.7	5 20 24.626	+ 3.2168	+ 6 16 14.49	+ 3.428
β Tauri	1.8	5 20 43.679	3.7911	+28 32 2.38	3.241
17 Camelopardalis	5.8	5 21 51.345	+ 5.6589	+62 59 41.74	+ 3.314

A Tauri, star 6^m.5 f. 38^s, 270″, s.
m* *Persei, star 6^m.5, 115″, s. pr.

ε Aurigæ, var. irreg., 3^m.0–4^m.5.

β Orionis, comp. 8^m.0, 9″.5, s. pr.

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Name of Star.	Magnitude.	Right Ascension.	Annual Variation.	Declination.	Annual Variation.
		h m s	s	° ′ ″	″
β Leporis . . .	3.0	5 24 28.488	+ 2.5702	−20 49 44.17	+3.006
χ Aurigæ . . .	4.9	5 26 59.951	3.9037	+32 7 40.08	2.863
δ Orionis . . . †	2.5	5 27 30.616	3.0641	− 0 21 48.78	2.830
Groombridge 966 .	6.4	5 27 57.022	8.0068	+74 59 14.52	2.811
α Leporis . . .	2.7	5 28 50.928	2.6456	−17 53 4.78	2.716
φ¹ Orionis . . .	4.5	5 29 59.315	+ 3.2924	+ 9 25 50.39	+2.602
ι Orionis . . . †	2.9	5 31 7.688	2.9341	− 5 58 1.19	2.516
ε Orionis . . .	1.8	5 31 44.858	3.0434	− 1 15 26.48	2.466
ζ Tauri . . .	3.0	5 32 23.096	3.5848	+21 5 22.58	2.378
Groombridge 944 .	6.4	5 33 38.985	18.7487	+85 9 19.11	2.296
ζ Orionis . . . †	2.0	5 36 19.093	+ 3.0269	− 1 59 18.69	+2.054
α Columbæ . . .	2.8	5 36 27.747	2.1724	−34 7 14.04	2.017
ο Aurigæ . . .	5.5	5 39 4.882	4.6449	+49 47 19.44	1.809
ζ Leporis . . .	3.7	5 42 58.055	2.7178	−14 51 14.71	1.488
κ Orionis . . .	2.2	5 43 34.962	2.8448	− 9 42 0.76	1.431
δ Doradus . . .	4.5	5 44 36.802	+ 0.1019	−65 46 6.72	+1.344
ν Aurigæ . . .	4.2	5 45 23.412	+ 4.1572	+39 7 25.31	1.290
31 Mensæ (G.) . .	6.2	5 47 13.194	−11.6913	−84 49 53.11	1.204
δ Leporis . . .	3.9	5 47 32.186	+ 2.5796	−20 53 9.27	0.441
α Orionis (*Betelgeux*) . †	*var.*	5 50 24.443	3.2478	+ 7 23 29.14	0.848
δ Aurigæ . . .	3.9	5 52 16.927	+ 4.9417	+54 16 44.98	+0.556
η Leporis . . .	3.8	5 52 23.800	2.7322	−14 10 59.25	0.806
β Aurigæ . . .	2.1	5 53 4.455	4.4017	+44 56 22.30	0.600
θ Aurigæ . . . †	2.7	5 53 43.227	4.0916	+37 12 26.34	+0.458
1 Geminorum . .	4.3	5 58 46.268	3.6474	+23 16 7.91	−0.001
1 Puppis (G.) . . †	6.2	6 1 56.453	+ 1.7257	−45 2 10.05	+0.055
ν Orionis . . .	4.4	6 2 32.878	3.4264	+14 46 47.10	−0.248
22 H. Camelopardalis .	4.7	6 9 9.132	6.6188	+69 21 8.16	0.914
η Geminorum . . †	*var.*	6 9 33.985	3.6227	+22 31 59.25	0.853
2 Lyncis . . .	4.4	6 11 51.711	5.2987	+59 2 38.65	1.007
ζ Canis Majoris . .	3.1	6 16 56.020	+ 2.3018	−30 1 26.47	−1.503
μ Geminorum . .	3.2	6 17 38.233	3.6307	+22 33 34.64	1.656
ψ¹ Aurigæ . . .	5.1	6 18 7.408	4.6261	+49 20 2.04	1.587
β Canis Majoris . .	2.0	6 18 49.447	2.6415	−17 54 41.43	1.641
8 Monocerotis . . †	4.5	6 19 6.324	3.1802	+ 4 38 17.90	1.660
α Argûs (*Canopus*) .	−0.9	6 21 59.906	+ 1.3319	−52 38 50.46	−1.912
10 Monocerotis . .	5.0	6 23 36.898	2.9641	− 4 42 25.20	2.056
ν Geminorum . .	4.1	6 23 44.290	3.5629	+20 16 7.26	2.088
8 Lyncis . . .	6.0	6 29 39.144	5.4927	+61 33 35.25	2.862
23 H. Camelopardalis .	5.6	6 31 14.073	10.3035	+79 39 42.89	3.356
ξ² Canis Majoris . .	4.5	6 31 22.107	+ 2.5157	−22 53 38.31	−2.700
51 Aurigæ . . .	5.7	6 32 33.736	4.1599	+39 28 9.62	2.951
γ Geminorum . .	1.9	6 32 37.728	3.4671	+16 28 30.59	2.892
ν Argûs . . .	3.2	6 35 4.199	1.8367	−43 7 6.17	3.074
S Monocerotis . . †	4.7	6 36 7.921	3.3047	+ 9 58 40.35	3.155
ε Geminorum . .	3.2	6 38 31.125	+ 3.6930	+25 13 8.88	−3.371
ξ Geminorum . .	3.4	6 40 21.054	3.3685	+12 59 28.61	3.704
ψ⁵ Aurigæ . . .	5.3	6 40 23.971	+ 4.3301	+43 39 57.55	−3.355

δ Orionis, star $6^{m}.9$, 52″.6, n.
ι Orionis, comp. $7^{m}.3$, 11″.5, s.f.
ζ Orionis, comp. $4^{m}.2$, 2″.4, s.f.

α Orionis, red star, var. irreg. $1^{m}.0$–$1^{m}.4$.
θ Aurigæ, comp. $7^{m}.5$, 2″.5, n.pr.
1 *Puppis*, star, $5^{m}.8$, 150″, s. f.

η Gem., var. $231^{d}.4$, $3^{m}.2$–$4^{m}.2$, comp. $8^{m}.8$, 1″.2, n. pr.
8 Monoc., star, $6^{m}.5$, 13″.7, n.
S Monoc., comp. $8^{m}.8$, 2″.9, s.

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Name of Star.	Magnitude.	Right Ascension.	Annual Variation.	Declination.	Annual Variation.
		h m s	s	° ′ ″	″
α Canis Majoris (*Sirius*) †	−1.6	6 41 16.216	+ 2.6435	−16 35 41.36	− 4.797
18 Monocerotis	4.7	6 43 16.323	3.1281	+ 2 30 33.15	3.778
43 Camelopardalis	5.1	6 44 13.406	6.4900	+68 59 31.50	3.832
θ Geminorum	3.6	6 46 59.454	3.9584	+34 4 5.75	4.132
α Pictoris	3.3	6 47 17.387	+ 0.6178	−61 50 48.55	3.869
ζ Mensæ	5.6	6 47 23.250	− 4.9372	−80 43 18.08	− 4.033
τ Argûs	2.8	6 47 45.143	+ 1.4884	−50 30 35.03	4.253
15 Lyncis †	4.5	6 49 39.768	5.2078	+58 32 21.44	4.440
θ Canis Majoris	4.2	6 50 6.108	2.7879	−11 55 39.42	4.355
ε Canis Majoris †	1.6	6 55 10.030	2.3574	−28 51 6.17	4.776
ζ Geminorum †	*var.*	6 58 53.444	+ 3.5608	+20 42 0.62	− 5.102
o^2 Canis Majoris	3.1	6 59 20.996	2.5048	−23 42 14.60	5.128
51 H. Cephei	5.3	6 59 37.82*	29.3185	+87 11 21.21	5.192
γ Canis Majoris	4.1	6 59 46.646	2.7148	−15 30 9.34	5.179
δ Canis Majoris	2.0	7 4 48.740	2.4381	−26 15 10.38	5.590
63 Aurigæ	5.1	7 5 36.325	+ 4.1333	+39 27 54.08	− 5.663
51 Geminorum	5.3	7 8 19.177	+ 3.4482	+16 18 32.68	5.929
γ^2 Volantis †	3.9	7 9 29.785	− 0.5002	−70 21 22.16	5.908
25 H. Camelopardalis	5.1	7 12 38.154	+12.8415	+82 35 1.82	6.294
λ Geminorum	3.6	7 13 2.220	3.4504	+16 41 59.49	6.326
π Argûs	2.7	7 14 2.086	+ 2.1189	−36 56 21.05	− 6.373
δ Geminorum †	3.5	7 14 52.153	+ 3.5867	+22 8 42.65	6.447
δ Volantis	4.0	7 16 53.055	− 0.0186	−67 47 46.31	6.606
7 Octantis (G.)	6.4	7 18 1.35*	−20.1468	−86 53 33.62	6.688
ι Geminorum	3.9	7 20 15.786	+ 3.7307	+27 58 25.69	6.965
η Canis Majoris	2.4	7 20 36.902	+ 2.3737	−29 7 51.07	− 6.899
Groombridge 1308	5.8	7 21 44.134	6.2775	+68 38 48.21	7.043
β Canis Minoris	3.1	7 22 22.772	3.2556	+ 8 28 2.47	7.098
ρ Geminorum	4.2	7 23 27.199	3.8635	+31 57 37.78	6.956
σ Argûs †	3.3	7 26 26.291	1.9018	−43 7 22.04	7.202
α^2 Geminorum (*Castor*)	2.0	7 28 59.236	+ 3.8336	+32 4 57.49	− 7.671
α^1 Geminorum	2.8	$\Delta\alpha$ − 0.276	. . . .	$\Delta\alpha$ − 4.11	. . .
25 Monocerotis	5.2	7 32 54.154	2.9820	− 3 54 49.49	7.884
α Can. Min. (*Procyon*) †	0.5	7 34 41.765	3.1423	+ 5 27 3.85	9.086
24 Lyncis	5.0	7 35 34.108	5.0952	+58 55 2.44	8.175
κ Geminorum †	3.7	7 39 8.242	+ 3.6269	+24 36 35.07	− 8.463
β Geminorum (*Pollux*)	1.2	7 39 55.990	3.6761	+28 14 22.30	8.521
4 Puppis	5.1	7 41 53.745	2.7636	−14 20 57.43	8.624
ξ Argûs	3.5	7 45 35.596	2.5232	−24 38 17.96	8.912
φ Geminorum	5.0	7 48 6.852	3.6770	+26 59 39.89	9.136
26 Lyncis	5.7	7 48 18.626	+ 4.3823	+47 47 37.10	− 9.130
Groombridge 1374	5.6	7 49 41.065	7.2497	+74 9 15.95	9.268
χ Argûs	3.6	7 54 32.514	1.5260	−52 44 45.90	9.601
ω Cancri	5.9	7 55 36.505	3.6343	+25 38 3.96	9.692
χ Geminorum	5.0	7 58 6.987	3.6908	+28 2 30.34	9.932
27 Lyncis	4.9	8 1 50.746	+ 4.5312	+51 45 40.70	−10.165
ρ Argûs	2.9	8 3 47.763	2.5546	−24 2 59.87	10.257
3 H. Ursæ Majoris	5.5	8 4 4.179	+ 6.0156	+68 44 3.58	−10.325

15 Lyncis, dup., $4^{m}.9$, $6^{m}.2$, 0″.7
ε Can. Maj., comp. 9^{m}, 7″.8, s.f.
ζ Gem., var., $10^{d}.15$, $3^{m}.7$–$4^{m}.3$

γ^2 Volantis, comp. $5^{m}.8$, 12″.9, n. pr.
δ Gem., comp. 8^{m}, 7″.0, s. pr.

σ Argûs, star. 8^{m}, 22″.4, n. f.
κ Gem., comp. $8^{m}.5$, 6″.6, s. pr.

Positions given for Sirius and Procyon are those of the centers of gravity of the systems. Corrections given *on page IX remain to be* applied to reduce to the positions of the stars.

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Name of Star.	Magnitude.	Right Ascension.			Annual Variation.	Declination.			Annual Variation.
		h	m	s	s	°	′	″	″
Argûs . . . †	2.2	8	6	49.298	+ 1.8498	−47	4	37.01	−10.546
Cancri (*mean*) . . †	4.7	8	7	10.019	3.4448	+17	54	50.24	10.689
Bradley 1147 . .	5.7	8	8	30.970	7.6284	+76	1	36.62	10.668
Puppis . . .	5.0	8	9	17.282	2.7580	−15	31	20.96	10.717
Groombridge 1119 .	7.0	8	10	44.772	61.5386	+88	53	55.27	10.808
Cancri . . .	3.8	8	11	44.637	+ 3.2559	+ 9	27	26.74	−10.951
Lyncis . . .	4.4	8	16	49.050	4.1218	+43	28	16.60	11.368
Cancri . . .	5.9	8	18	19.620	3.4394	+18	36	55.40	11.409
Argûs . . .	1.7	8	20	42.545	1.2340	−59	13	33.84	11.541
Monocerotis . .	4.0	8	21	15.870	2.9997	− 3	37	7.34	11.608
Ursæ Majoris . .	3.5	8	22	57.868	+ 5.0145	+61	0	47.96	−11.821
Chamæleontis . .	4.3	8	23	17.853	− 1.7422	−77	12	3.66	11.716
Groombridge 1450 .	6.0	8	27	11.989	+ 3.9100	+38	19	8.18	12.187
Cancri . . .	5.5	8	27	37.337	3.4748	+20	44	26.64	12.093
Groombridge 1446 .	6.3	8	29	56.962	6.7515	+73	56	18.18	12.317
Hydræ . . .	4.2	8	32	59.929	+ 3.1783	+ 6	0	40.48	−12.424
Hydræ . . .	4.5	8	34	9.552	3.1384	+ 3	39	3.76	12.502
Cancri . . .	4.7	8	38	11.770	3.4773	+21	47	8.25	12.807
Cancri . . .	4.2	8	39	41.187	3.4142	+18	28	42.03	13.104
Pyxidis . . .	3.7	8	40	3.329	2.4109	−32	52	7.26	12.878
Cancri . . . †	4.2	8	41	22.546	+ 3.6385	+29	4	56.78	−13.028
Hydræ . . . †	3.5	8	42	7.042	3.1800	+ 6	44	32.37	13.075
Argûs . . . †	2.0	8	42	16.243	1.6518	−54	23	8.77	13.136
Cancri (*mean*) . . †	5.5	8	48	52.750	3.6686	+30	54	48.01	13.492
Hydræ . . .	3.3	8	50	44.631	3.1746	+ 6	16	51.78	13.584
Ursæ Majoris . .	3.1	8	53	11.344	+ 4.1241	+48	23	16.27	−13.996
Cancri . . .	4.3	8	53	40.570	3.2848	+12	11	56.07	13.820
Carinæ . . . †	5.1	8	54	49.158	1.4683	−58	53	22.30	13.869
Ursæ Majoris . .	3.7	8	57	37.443	4.1120	+47	30	18.83	14.094
Ursæ Majoris . . †	4.9	9	2	40.028	5.3261	+67	29	33.62	14.405
Cancri . . .	5.1	9	2	58.960	+ 3.2530	+11	1	22.38	−14.371
Argûs . . .	2.2	9	4	45.519	+ 2.2060	−43	4	37.41	14.472
Octantis . . .	5.4	9	9	38.50*	− 8.0707	−85	18	43.98	14.716
Hydræ . . .	3.8	9	9	47.242	+ 3.1238	+ 2	41	9.98	15.079
Argûs . . .	1.8	9	12	14.313	0.6710	−69	21	16.74	14.817
Cancri . . .	6.6	9	14	4.363	+ 3.3540	+18	4	44.14	−15.154
Argûs . . .	2.2	9	14	43.970	1.6041	−58	54	20.30	15.050
Lyncis . . .	3.3	9	15	41.887	3.6643	+34	45	54.94	15.099
Pyxidis . . .	4.9	9	17	35.627	2.6513	−25	35	27.12	15.252
Hydræ . . .	2.2	9	23	15.807	2.9487	− 8	16	35.88	15.505
Ursæ Majoris . .	3.8	9	24	36.359	+ 4.7683	+63	26	50.33	−15.588
H. Draconis . .	4.6	9	24	37.695	8.8239	+81	42	59.81	15.640
Ursæ Majoris . .	4.6	9	26	43.372	5.3652	+70	13	4.39	15.656
Ursæ Majoris . .	3.3	9	26	58.762	4.0320	+52	4	44.57	16.285
Leonis . . .	5.1	9	27	12.262	3.2372	+11	41	24.11	15.837
Argûs . . . †	3.6	9	27	13.885	+ 2.3592	−40	4	52.87	−15.716
Leonis Minoris . .	4.6	9	28	50.225	3.6860	+36	47	19.91	15.862
Leonis . . .	3.8	9	36	27.345	+ 3.2053	+10	17	35.66	−16.274

rgûs, star 5^m, 42″.5, s. pr.

ancri, triple; binary $5^m.6$, $6^m.3$, 1″ with comp. $6^m.0$, 5″.4 s.f.

ancri, star $6^m.6$, 30″.6, n. pr.

ε Hydri, triple; binary $3^m.5$, $6^m.8$, 0″.2, with comp. $7^m.8$, 3″.3

δ Argûs, comp. 5^m, 2″, s.

σ^2 Cancri, dup. $5^m.9$, $6^m.4$, 1″.4

b^1 Carinæ, comp. $7^m.2$, 5^s, f.

σ^2 Urs. Maj., binary $4^m.9$, 8^m, 1″.3

ψ Argûs, dup. $3^m.8$, $6^m.0$, 0″.8

[Feb. 10]

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Name of Star.		Magnitude.	Right Ascension.	Annual Variation.	Declination.	A Var
			h m s	s	° ′ ″	
ζ Chamæleontis		5.2	9 36 30.596	−1.6422	−80 32 45.72	−1
θ Antliæ		5.0	9 40 16.715	+2.6729	−27 21 58.20	1
ε Leonis		3.1	9 40 51.538	3.4115	+24 10 47.48	1
υ Ursæ Majoris		3.9	9 44 44.572	4.2946	+59 27 11.62	1
υ Argûs	†	3.2	9 44 54.185	1.5010	−64 39 49.30	1
6 Sextantis		6.0	9 46 48.014	+3.0246	− 3 49 49.64	−1
μ Leonis		4.1	9 47 45.669	3.4177	+26 25 18.82	1
Groombridge 1586		6.0	9 50 32.438	5.4371	+73 17 54.76	1
19 Leonis Minoris		5.2	9 52 17.972	3.6861	+41 28 30.86	1
φ Argûs		3.7	9 53 46.252	2.1013	−54 8 55.58	1
π Leonis		4.9	9 55 33.858	+3.1725	+ 8 28 0.67	−1
η Leonis		3.6	10 2 32.132	3.2731	+17 11 31.94	1
α Leonis (*Regulus*)		1.3	10 3 41.230	3.1985	+12 23 51.63	1
λ Hydræ		3.8	10 6 17.880	2.9246	−11 55 7.28	1
q Velorum		4.1	10 11 2.322	2.5126	−41 41 8.31	1
32 Ursæ Majoris		5.7	10 11 39.468	+4.3967	+65 32 52.18	−1
λ Ursæ Majoris		3.5	10 11 47.741	3.6322	+43 21 15.44	1
ζ Leonis		3.6	10 11 47.926	3.3428	+23 51 22.47	1
γ Leonis *pr.*	†	2.6	10 15 7.380	3.3120	+20 17 13.41	1
μ Ursæ Majoris		3.2	10 17 5.516	3.5870	+41 56 32.93	1
30 H. Ursæ Majoris		4.9	10 17 48.349	+4.3654	+66 0 42.78	−1
30 H. Camelopardalis		5.3	10 20 26.885	7.6113	+83 0 25.01	1
μ Hydræ		4.1	10 21 50.034	2.9004	−16 23 12.08	1
31 Leonis Minoris		4.4	10 22 47.981	3.4800	+37 9 30.35	1
α Antliæ		4.4	10 23 7.403	2.7421	−30 37 11.01	1
36 Ursæ Majoris		4.8	10 25 0.266	+3.8628	+56 25 55.72	−1
9 H. Draconis		5.0	10 27 38.820	5.1926	+76 10 0.32	1
ρ Leonis		3.8	10 28 10.751	3.1618	+ 9 45 35.26	1
33 Sextantis		6.4	10 36 55.577	3.0520	− 1 16 42.51	1
41 Leonis Minoris		5.0	10 38 38.040	3.2676	+23 38 57.87	1
θ Argûs		3.0	10 39 48.827	+2.1318	−63 56 1.40	−1
42 Leonis Minoris		5.4	10 40 58.500	3.3432	+31 8 45.89	1
η Argûs	†	*var.*	10 41 38.631	2.3201	−59 13 18.09	1
μ Argûs	†	2.8	10 42 58.891	2.5729	−48 57 18.89	1
l Leonis		5.3	10 44 38.004	3.1567	+11 0 39.70	1
δ^2 Chamæleontis	†	4.6	10 44 58.043	+0.5971	−80 4 33.71	−1
ν Hydræ		3.3	10 45 16.900	2.9580	−15 43 57.76	1
46 Leonis Minoris		3.9	10 48 23.655	3.3643	+34 41 22.51	1
54 Leonis	†	4.5	10 50 51.053	3.2535	+25 13 9.73	1
ι Antliæ		4.7	10 52 37.128	2.7955	−36 39 52.25	1
Groombridge 1706		6.3	10 52 56.797	+4.8978	+78 14 30.71	−1
α Crateris		4.2	10 55 29.134	2.9204	−17 49 48.50	1
d Leonis		5.0	10 56 0.984	3.0993	+ 4 5 24.56	1
β Ursæ Majoris (*Mcrak*)		2.4	10 56 32.390	3.6425	+56 51 15.65	1
α Ursæ Majoris (*Dubhe*)		2.0	10 58 18.487	+3.7310	+62 13 34.69	1
η Octantis		6.3	10 59 57.052	−0.3460	−84 7 13.77	−1
χ Leonis		4.7	11 0 28.724	+3.0963	+ 7 48 43.47	1
p^4 Leonis		5.7	11 2 24.939	+3.0614	+ 2 26 0.76	−1

υ Argûs, comp. 6^{m}.0, 4″.9, s. f.
γ Leonis, comp. 3^{m}.8, 3″.7, s. f.
η Argûs, var., irreg., 1^{m}.6–6^{m}.6
μ Argûs, comp. 7^{m}, 2″.2, n. f.
δ^2 Cham., star 5^{m}.5 pr. 32^{s}, 2
54 Leonis, comp. 6^{m}.3, 6″.4,

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Name of Star.	Magnitude.	Right Ascension.	Annual Variation.	Declination.	Annual Variation.
		h m s	s	° ′ ″	″
ψ Ursæ Majoris . .	3.2	11 4 43.311	+3.3862	+44 58 34.31	−19.498
β Crateris . . .	4.5	11 7 19.687	2.9473	−22 20 43.27	19.625
δ Leonis . . .	2.6	11 9 25.847	3.1956	+21 0 21.52	19.701
θ Leonis . . .	3.4	11 9 37.407	3.1508	+15 54 38.57	19.648
ν Ursæ Majoris . .	3.7	11 13 43.757	3.2486	+33 34 28.81	19.612
δ Crateris . . .	3.8	11 14 56.389	+2.9972	−14 18 7.86	−19.464
σ Leonis . . .	4.1	11 16 35.985	3.0951	+ 6 30 42.60	19.700
π Centauri . . .	4.3	11 16 59.370	2.7252	−54 0 31.11	19.707
ι Leonis . . . †	4.0	11 19 20.248	3.1288	+11 0 50.75	19.814
τ Leonis . . .	5.2	11 23 24.727	3.0858	+ 3 20 27.72	19.807
λ Draconis . . .	4.1	11 26 11.645	+3.5996	+69 49 0.80	−19.849
ξ Hydræ . . .	3.7	11 28 40.274	2.9457	−31 22 14.45	19.913
λ Centauri . . .	3.3	11 31 42.893	2.7488	−62 31 58.27	19.920
υ Leonis . . .	4.5	11 32 26.583	3.0716	− 0 20 16.02	19.862
π Chamæleontis . .	5.7	11 33 37.470	2.4508	−75 24 33.78	19.936
3 Draconis . . .	5.5	11 37 34.525	+3.3756	+67 13 55.17	−19.915
ζ Crateris . . .	4.9	11 40 18.041	3.0374	−17 51 41.22	20.013
χ Ursæ Majoris . .	3.8	11 41 24.548	3.1811	+48 16 2.54	19.960
β Leonis (*Denebola*) .	2.2	11 44 34.341	3.0626	+15 3 50.52	20.119
β Virginis . . .	3.8	11 46 6.685	3.1252	+ 2 15 38.58	20.284
Groombridge, 1830 .	6.5	11 47 54.671	+3.4686	+38 21 1.11	−25.801
γ Ursæ Majoris . .	2.5	11 49 12.502	3.1713	+54 11 2.57	20.019
π Virginis . . .	4.6	11 56 21.809	3.0743	+ 7 6 18.10	20.075
ο Virginis . . .	4.2	12 0 43.622	3.0571	+ 9 13 18.01	20.013
δ Centauri . . .	2.9	12 3 47.512	3.0941	−50 13 56.83	20.073
ε Corvi . . .	3.2	12 5 35.801	+3.0808	−22 7 49.41	−20.037
4 H. Draconis . .	5.1	12 8 5.409	2.8512	+78 6 18.78	20.014
δ Crucis . . .	3.1	12 10 28.190	3.1733	−58 15 35.01	20.063
δ Ursæ Majoris . .	3.4	12 11 4.692	2.9861	+57 31 17.58	20.017
γ Corvi . . .	2.8	12 11 16.696	3.0813	−17 3 11.81	20.005
2 Canum Venaticorum. †	5.8	12 11 43.275	+3.0167	+41 8 59.59	−20.065
β Chamæleontis . .	4.4	12 13 9.591	3.4420	−78 49 24.96	19.996
Bradley 1672 . .	6.3	12 14 26.635	0.3397	+88 11 15.83	19.948
η Virginis . . .	4.0	12 15 24.221	3.0693	− 0 10 40.17	20.028
α^1 Crucis . . .	1.6	12 21 41.623	3.3100	−62 36 41.45	19.996
α^2 Crucis . . .	2.1	$\Delta\alpha + 0.609$	. . . .	$\Delta\delta - 1.31$	. . . .
20 Comæ . . .	5.7	12 25 18.125	+3.0185	+21 22 59.97	−19.960
δ Corvi . . . †	3.1	12 25 18.559	3.1008	−16 1 32.13	20.072
γ Crucis . . . †	1.6	12 26 16.512	3.3018	−56 37 13.37	20.175
8 Canum Venaticorum	4.3	12 29 34.056	2.8570	+41 50 7.81	19.600
κ Draconis . . .	3.9	12 29 44.035	+2.5792	+70 16 23.58	−19.867
β Corvi . . .	2.8	12 29 45.678	3.1449	−22 54 36.72	19.938
24 Comæ *seq.* . . †	5.2	12 30 42.978	3.0109	+18 51 40.76	19.853
α Muscæ . . .	2.9	12 31 55.368	3.5385	−68 39 2.78	19.880
χ Virginis . . .	4.8	12 34 42.168	3.0935	− 7 30 41.11	19.847
γ Centauri . . . †	2.4	12 36 39.480	+3.2934	−48 28 36.04	−19.809
γ Virginis (*mean*) . †	2.9	12 37 12.091	3.0397	− 0 58 0.74	19.778
ρ Virginis . . .	5.0	12 37 25.862	+3.0373	+10 43 13.30	−19.886

ι Leonis, comp. $6^m.8$, 2″.6, n. f.
2 Can. Ven., star 8^m, 11″.6, s. pr.
δ Corvi, star, 8^m, 24″.4, s. pr.

γ Crucis, star, $6^m.6$, 85″, n. f.
24 Comæ, star, $6^m.7$, 20″.6, pr.
γ Cent., dup., $3.^m1$, $3^m.1$, 1″.4.

γ Virginis, binary, $3^m.7$, $3^m.7$, 6″.2, P=328°

MEAN PLACES OF STARS, 1912.

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Name of Star.	Magnitude.	Right Ascension.	Annual Variation.	Declination.	Annu Variat
		h m s	s	° ′ ″	″
76 Ursæ Majoris	5.9	12 37 43.494	+2.6326	+63 11 45.84	−19.
β Crucis	1.5	12 42 34.236	3.4803	−59 12 28.48	19.
ι Octantis	5.4	12 45 37.397	5.9286	−84 38 44.23	19.
31 Comæ	5.1	12 47 24.787	2.9242	+28 1 9.72	19.
32 H. Camelop. *seq.* †	5.3	12 48 28.229	0.4328	+83 53 28.38	19.
n Centauri	4.3	12 48 33.498	+3.3119	−39 42 1.62	−19.
ε Ursæ Majoris (*Alioth*)	1.7	12 50 9.694	2.6490	+56 26 14.35	19.
δ Virginis	3.7	12 51 10.204	3.0207	+ 3 52 31.82	19.
α Canum Venat. *seq.* †	2.9	12 51 54.803	2.8110	+38 47 36.40	19.
δ Muscæ	3.6	12 56 11.897	4.0683	−71 4 27.80	19.
ε Virginis	3.0	12 57 47.781	+2.9865	+11 25 54.93	−19.
θ Virginis †	4.4	13 5 23.519	3.1030	− 5 4 9.90	19.
43 Comæ	4.3	13 7 46.106	2.8028	+28 19 26.52	18.
20 Canum Venaticorum	4.7	13 13 35.969	2.6960	+41 2 8.62	19.
γ Hydræ	3.3	13 14 8.061	3.2549	−22 42 26.93	19.
ι Centauri	2.9	13 15 38.658	+3.3608	−36 14 54.12	−19.
ζ^1 Ursæ Maj. (*Mizar*) †	2.4	13 20 23.138	2.4226	+55 23 4.94	18.
ζ^2 Ursæ Majoris	4.0	$\Delta\alpha+0.956$	....	$\Delta\delta-12.67$	..
α Virginis (*Spica*)	1.2	13 20 33.305	3.1567	−10 42 7.95	18.
Groombridge 2001	6.1	13 23 53.294	1.5240	+72 50 53.57	18.
70 Virginis	5.2	13 24 7.557	+2.9340	+14 14 54.68	−19.
κ Octantis	5.6	13 26 29.25*	9.0321	−85 20 8.98	18.
ζ Virginis	3.4	13 30 12.462	3.0543	− 0 8 46.42	18.
17 H. Canum Ven.	5.0	13 30 52.163	2.6820	+37 37 59.00	18.
ε Centauri	2.6	13 34 18.229	3.7785	−53 1 9.88	18.
m Virginis	5.2	13 36 59.475	+3.1449	− 8 15 33.36	−18.
τ Boötis	4.5	13 43 4.817	2.8509	+17 53 41.90	18.
η Ursæ Majoris (*Alkaid*)	1.9	13 44 4.501	2.3683	+49 45 7.73	18.
89 Virginis	5.1	13 45 5.217	3.2536	−17 41 46.06	18.
ζ Centauri	3.1	13 50 2.596	3.7242	−46 51 20.21	17.
η Boötis	2.8	13 50 29.684	+2.8567	+18 50 18.57	−18.
θ Apodis †	*var.*	13 56 43.007	5.7309	−76 22 21.22	17.
τ Virginis	4.3	13 57 10.012	3.0511	+ 1 58 12.09	17.
11 Boötis	6.1	13 57 11.121	2.7216	+27 48 40.39	17.
β Centauri	0.9	13 57 36.206	4.2032	−59 56 56.08	17.
π Hydræ	3.5	14 1 21.397	+3.4087	−26 15 31.98	−17.
θ Centauri	2.3	14 1 29.921	3.5187	−35 56 14.78	17.
α Draconis	3.6	14 2 0.431	1.6243	+64 47 46.30	17.
d Boötis	4.8	14 6 23.178	2.7371	+25 30 29.03	17.
κ Virginis	4.3	14 8 11.971	+3.1964	− 9 51 52.32	16.
4 Ursæ Minoris	5.0	14 9 10.463	−0.2860	+77 57 39.48	−16.
ι Virginis	4.2	14 11 23.880	+3.1422	− 5 34 51.51	17.
α Boötis (*Arcturus*)	0.2	14 11 38.823	2.7354	+19 38 24.52	18.
δ Octantis	4.1	14 12 41.586	9.2145	−83 15 57.15	16.
λ Boötis	4.3	14 13 2.390	2.2833	+46 29 31.30	16.
λ Virginis	4.6	14 14 20.708	+3.2404	−12 57 59.75	−16.
2 Libræ	6.3	14 18 41.360	3.2233	−11 18 45.17	16.
θ Boötis	4.1	14 22 12.113	+2.0433	+52 15 25.75	−16.

32 H. Cam., star 5^m.8, 21″.6, n.pr.
α Can. Ven., star 5^m, 19″.8, s. pr.

θ Virginis, comp. 9^m, 7″.1, n. pr.
ζ^1 Urs. Maj., star Alcor 4^m.0, f. 79^s.2, 222″ n.

θ Apodis, var. irreg. 5^m.5–

Name of Star.	Magnitude.	Right Ascension.	Annual Variation.	Declination.	Annual Variation.
		h m s	s	° ′ ″	″
ötis	5.4	14 22 21.752	+ 2.7901	+19 37 19.52	−16.287
ginis †	5.0	14 23 40.014	+ 3.0887	− 1 50 1.99	16.238
æ Minoris	4.4	14 27 41.796	− 0.1662	+76 5 14.16	16.004
ötis	3.8	14 28 2.276	+ 2.5865	+30 45 26.17	15.894
ötis	3.0	14 28 32.114	2.4172	+38 41 34.06	15.836
tauri	2.6	14 29 54.840	+ 3.7957	−41 46 18.26	−15.940
ötis	4.5	14 30 50.970	2.6132	+30 7 37.24	15.733
tauri †	0.1	14 33 36.781	4.0525	−60 28 21.83	14.984
ötis	5.4	14 35 33.798	2.2342	+44 47 1.74	15.646
odis	3.8	14 36 52.505	7.2818	−78 40 19.78	15.554
ginis	4.0	14 38 25.257	+ 3.1584	− 5 16 34.00	−15.766
ötis †	2.7	14 41 8.633	2.6203	+27 26 40.95	15.282
ginis	3.8	14 41 47.931	3.0309	+ 2 15 47.58	15.289
ræ	5.3	14 45 48.995	3.3128	−15 37 54.59	15.098
ræ	2.9	14 46 0.439	3.3133	−15 40 35.80	15.089
ombridge 2164	5.7	14 49 12.324	+ 1.5199	+59 39 4.74	−14.708
æ Minoris	2.2	14 50 57.086	− 0.2076	+74 30 54.42	14.720
ræ	5.6	14 51 59.428	+ 3.2501	−11 3 18.25	14.662
zzi 221	5.8	14 52 3.945	2.8296	+14 48 5.13	14.668
pi	2.8	14 52 45.614	3.9119	−42 46 48.71	14.678
ræ †	*var.*	14 56 16.088	+ 3.2009	− 8 10 13.08	−14.419
ötis	3.6	14 58 37.882	2.2600	+40 44 13.91	14.299
rpii	3.4	14 58 54.988	3.5042	−24 56 11.79	14.289
ötis	4.7	15 0 40.483	2.5703	+27 17 24.93	14.146
ötis	5.0	15 3 26.153	+ 2.6347	+25 12 40.79	14.145
ombridge 2283	7.2	15 5 18.999	−19.7324	+87 34 19.83	−13.810
pi	3.5	15 5 57.361	+ 4.2901	−51 45 53.36	13.867
ræ	4.7	15 7 12.122	3.4136	−19 27 33.75	13.775
anguli Australis	3.1	15 10 40.601	5.5484	−68 21 19.54	13.540
pentis	5.4	15 10 48.808	2.9798	+ 5 15 55.83	13.495
ötis	3.5	15 11 57.309	+ 2.4193	+33 38 33.26	−13.541
ræ	2.7	15 12 16.169	+ 3.2245	− 9 3 31.67	13.420
æ Minoris	3.1	15 20 51.640	− 0.1179	+72 8 49.56	12.814
ötis *pr.* †	4.5	15 21 9.964	+ 2.2663	+37 41 7.11	12.726
pentis	5.5	15 21 42.423	2.7799	+15 44 12.69	12.794
antis	5.7	15 22 49.95*	+13.2938	−84 10 27.50	−12.615
conis	3.5	15 22 58.326	1.3330	+59 16 26.33	12.676
ræ	5.6	15 23 17.460	3.3783	−16 24 37.21	12.706
onæ Borealis	3.7	15 24 12.054	2.4737	+29 24 30.67	12.523
ötis	5.2	15 27 46.106	2.1551	+41 7 57.17	12.371
pi (*mean*) †	3.0	15 29 16.296	+ 3.9858	−40 52 18.57	−12.302
ræ	4.0	15 30 36.095	3.3519	−14 29 47.58	12.155
onæ Borealis	2.3	15 30 57.695	2.5394	+27 0 36.95	12.236
onæ Borealis *seq.* †	5.1	15 36 3.854	2.2595	+36 55 15.64	11.790
pentis	2.8	15 39 55.937	2.9529	+ 6 42 6.75	11.460
pentis	3.7	15 42 7.571	+ 2.7684	+15 41 47.63	−11.400
pentis	4.3	15 44 46.666	2.6994	+18 24 45.57	11.253
pentis	3.6	15 45 1.564	+ 3.1281	− 3 9 41.61	−11.163

nis, comp. 9^m, 4″.5 s. f.
s, comp. $5^m.1$, 2″.8, n. pr.

δ *Libræ, var.,* $2^d.33$, $4^m.8$–$6^m.2$
μ *Boötis, star* $6^m.7$, 108″ s.

γ Lupi, binary $3^m.7$, $3^m.9$, 0″.4
ζ Cor. Bor., comp., $6^m.0$, 6″.2 n. pr.

uri, dup., $0^m.3$, $1^m.7$; companion s. pr. The position given is that of the center of gravity of the system.
given on page IX remain to be applied to reduce to the positions of the stars.

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Name of Star.	Magnitude.	Right Ascension.			Annual Variation.	Declination.			Annual Variation.
		h	m	s	s	°	′	″	″
12 H. Draconis	5.1	15	45	19.333	+0.9065	+62	52	16.56	−11.182
ε Serpentis	3.8	15	46	25.683	+2.9882	+ 4	44	31.63	10.963
ζ Ursæ Minoris	4.3	15	47	10.714	−2.2096	+78	3	56.31	10.982
β Trianguli Australis	3.0	15	47	22.722	+5.2545	−63	9	36.14	11.371
λ Libræ	5.1	15	48	13.364	3.4769	−19	54	17.33	10.948
γ Serpentis	3.9	15	52	23.258	+2.7695	+15	56	53.62	−11.883
π Scorpii	3.0	15	53	31.524	3.6232	−25	51	41.37	10.558
ε Coronæ Borealis	4.2	15	53	56.597	2.4822	+27	7	55.59	10.545
δ Scorpii	2.5	15	55	7.620	3.5418	−22	22	19.12	10.424
θ Draconis	4.1	16	0	14.370	1.1213	+58	48	0.10	9.666
β Scorpii †	2.9	16	0	19.023	+3.4831	−19	33	54.92	−10.027
κ Herculis †	5.3	16	4	6.112	2.7050	+17	16	50.07	9.734
φ Herculis	4.3	16	5	59.815	1.8896	+45	9	54.74	9.529
Groombridge 2320	5.4	16	6	4.709	0.1516	+68	2	30.53	9.507
δ¹ Apodis	4.8	16	7	9.463	8.8434	−78	28	32.91	9.531
δ Ophiuchi	3.0	16	9	43.949	+3.1412	− 3	28	6.16	− 9.421
σ Coronæ Bor. *seq.* †	5.8	16	11	22.959	2.2457	+34	4	52.46	9.220
γ² Normæ	4.1	16	13	14.835	+4.4709	−49	56	26.01	9.067
19 Ursæ Minoris	5.5	16	13	19.162	−1.7521	+76	5	58.06	8.990
ε Ophiuchi	3.3	16	13	39.811	+3.1716	− 4	28	43.22	8.934
σ Scorpii †	3.1	16	15	50.213	+3.6411	−25	22	56.69	− 8.839
τ Herculis	3.9	16	17	5.740	1.8030	+46	31	20.78	8.672
γ Herculis	3.8	16	18	2.249	2.6453	+19	21	32.78	8.590
γ Apodis	3.9	16	19	55.120	+9.0928	−78	42	4.78	8.561
η Ursæ Minoris	5.0	16	20	3.696	−1.7939	+75	57	30.65	8.214
ω Herculis	4.5	16	21	21.036	+2.7617	+14	14	6.86	− 8.424
η Draconis †	2.9	16	22	47.851	0.8073	+61	42	47.40	8.191
α Scorpii (*Antares*) †	1.2	16	24	0.553	3.6737	−26	14	14.92	8.181
β Herculis	2.8	16	26	26.144	2.5773	+21	40	50.37	7.983
λ Ophiuchi †	3.8	16	26	28.435	+3.0237	+ 2	10	33.06	8.034
A Draconis	5.0	16	28	8.974	−0.1309	+68	57	30.77	− 7.785
τ Scorpii	2.9	16	30	24.094	+3.7292	−28	2	3.34	7.674
σ Herculis	4.2	16	31	15.948	1.9333	+42	37	4.49	7.543
ζ Ophiuchi	2.7	16	32	18.691	3.3006	−10	23	22.42	7.462
24 Scorpii	5.0	16	36	28.887	3.4662	−17	34	21.12	7.148
ζ Herculis †	3.0	16	37	58.111	+2.2613	+31	45	42.01	− 6.633
α Trianguli Australis	1.9	16	39	20.140	6.3209	−68	52	2.78	6.960
η Herculis	3.6	16	39	52.705	2.0557	+39	5	20.53	6.959
Groombridge 2377	4.9	16	43	37.660	1.1370	+56	56	19.96	6.495
ε Scorpii	2.4	16	44	27.630	3.8793	−34	8	4.02	6.752
49 Herculis	6.4	16	48	4.432	+2.7301	+15	7	16.05	− 6.202
ε¹ Aræ	4.2	16	52	33.893	4.7704	−53	1	34.89	5.830
κ Ophiuchi	3.4	16	53	30.124	+2.8381	+ 9	30	40.08	5.746
ε Ursæ Minoris	4.4	16	54	56.786	−6.2674	+82	11	0.93	5.614
30 Ophiuchi	5.0	16	56	25.185	+3.1628	− 4	5	28.80	5.565
ε Herculis	3.9	16	56	55.332	+2.2945	+31	3	19.39	− 5.425
d Herculis	5.3	16	58	21.356	2.2120	+33	41	42.13	5.336
η Ophiuchi †	2.6	17	5	19.763	+3.4373	−15	37	0.08	− 4.645

β Scorpii, comp. 5^{m}.1, 13″.3 n. f.
κ Herculis, star 6^{m}.5, 29″.7 n. f.
σ Cor. Bor. comp. 6^{m}.7, 4″.6 s. pr.

σ Scorpii, star 8^{m}, 20″ pr.
η Draconis, comp. 8^{m}, 5″.4 s. f.
α Scorpii, comp. 7^{m}, 3″.2 pr.

λ Ophiuchi, comp. 6^{m}, 1″.2 n. f.
ζ Herculis, binary, 3^{m}.0, 6^{m}.0, 1″.
η Oph., binary, 3^{m}.2, 3^{m}.7, 0″.5

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Name of Star.	Magnitude.	Right Ascension.			Annual Variation.	Declination.			Annual Variation.
		h	m	s	s	°	′	″	″
η Scorpii	3.4	17	5	50.859	+ 4.2917	−43	7	27.23	−4.998
ζ Draconis	3.2	17	8	31.799	0.1684	+65	49	22.50	4.447
α Herculis . †	var.	17	10	38.058	2.7344	+14	29	23.69	4.255
δ Herculis . †	3.2	17	11	24.980	2.4631	+24	56	32.44	4.376
π Herculis	3.4	17	11	58.874	2.0883	+36	54	27.96	4.170
59 Apodis (G.)	5.9	17	14	59.090	+11.1556	−80	46	47.01	−3.950
θ Ophiuchi	3.4	17	16	36.212	3.6815	−24	54	45.16	3.809
ω Herculis	5.4	17	17	21.951	2.2428	+32	34	49.01	4.754
β Aræ	2.8	17	17	58.920	4.9803	−55	26	51.47	3.682
b Ophiuchi	4.3	17	20	59.644	3.6606	−24	5	43.08	3.533
σ Ophiuchi	4.4	17	22	8.875	+ 2.9755	+ 4	12	58.28	−3.288
δ Aræ	3.8	17	23	9.009	5.4050	−60	36	42.50	3.329
α Aræ	3.0	17	25	2.209	4.6324	−49	48	26.65	3.130
λ Herculis	4.5	17	27	10.902	2.4240	+26	10	34.93	2.842
λ Scorpii	1.7	17	27	37.878	4.0707	−37	2	25.43	2.849
β Draconis	3.0	17	28	26.622	+ 1.3541	+52	21	58.15	−2.743
α Ophiuchi	2.1	17	30	50.938	2.7837	+12	37	23.97	2.778
ξ Serpentis	3.6	17	32	32.777	3.4328	−15	20	37.78	2.456
ι Herculis	3.8	17	36	58.859	1.6934	+46	3	9.82	2.007
η Pavonis	3.6	17	37	5.514	+ 5.8806	−64	40	58.77	2.080
ω Draconis	4.9	17	37	27.911	− 0.3545	+68	47	55.27	−1.650
β Ophiuchi	2.9	17	39	7.499	+ 2.9628	+ 4	36	12.08	1.666
ι¹ Scorpii	3.1	17	41	25.779	4.1945	−40	5	37.65	1.630
μ Herculis	3.5	17	43	0.837	2.3469	+27	46	17.55	2.233
γ Ophiuchi	3.7	17	43	28.777	+ 3.0071	+ 2	44	22.90	1.516
ψ Draconis . †	4.9	17	43	30.030	− 1.0748	+72	11	32.25	−1.710
89 Herculis	5.5	17	51	52.207	+ 2.4206	+26	3	48.23	0.705
ξ Draconis	3.9	17	52	0.494	1.0379	+56	53	10.33	0.622
θ Herculis	4.0	17	53	14.092	+ 2.0570	+37	15	41.81	0.587
35 Draconis	5.0	17	53	23.250	− 2.6904	+76	58	30.44	0.335
ν Ophiuchi	3.5	17	54	10.885	+ 3.3018	− 9	45	48.85	−0.628
ξ Herculis	3.8	17	54	20.720	2.3314	+29	15	24.41	0.512
γ Draconis	2.4	17	54	33.755	1.3924	+51	29	55.83	0.500
67 Ophiuchi	3.9	17	56	14.277	3.0048	+ 2	56	6.31	0.342
θ Aræ	3.9	17	59	46.817	4.6698	−50	5	54.53	0.070
γ Sagittarii	3.1	18	0	9.222	+ 3.8519	−30	25	33.71	−0.185
δ Ursæ Minoris	4.4	18	0	38.79*	−19.4977	+86	36	51.01	+0.104
70 Ophiuchi . †	4.1	18	1	0.401	+ 3.0315	+ 2	31	8.99	−1.034
72 Ophiuchi	3.7	18	3	10.631	2.8432	+ 9	33	2.54	+0.365
χ Octantis	5.2	18	3	13.216	35.7415	−87	39	53.25	0.157
o Herculis	3.8	18	4	6.562	+ 2.3394	+28	44	59.10	+0.361
μ Sagittarii	4.0	18	8	30.008	3.5870	−21	4	57.62	0.742
η Sagittarii	3.2	18	11	40.397	4.0597	−36	47	19.56	0.868
Groombridge 2533	5.4	18	12	54.523	1.8652	+42	7	43.86	1.127
36 Draconis	5.0	18	13	23.423	0.3456	+64	22	2.32	1.196
δ Sagittarii	2.8	18	15	21.620	+ 3.8406	−29	51	58.95	+1.309
η Serpentis	3.4	18	16	45.334	3.1027	− 2	55	20.37	−0.773
ε Sagittarii	2.0	18	18	19.848	+ 3.9815	−34	25	37.03	+1.479

α Herculis, var. irreg., $3^m.1$–$3^m.9$. dup. comp. 6^m, 4″.6 s. f.

δ Herculis, binary, comp. 8^m, 14″ s. pr.

ψ Draconis, star $6^m.1$, 30″.4 n. f.

70 Ophiuchi, comp. 6^m, 2″.1 s.

MEAN PLACES OF STARS, 1912.

WASHINGTON, JANUARY $1^d.006$.

Name of Star.	Magnitude.	Right Ascension.			Annual Variation.	Declination.			Annual Variation.
		h	m	s	s	°	′	″	″
109 Herculis	3.9	18	19	56.862	+ 2.5558	+21	43	44.11	+1.481
α Telescopii	3.8	18	20	26.915	4.4501	−46	1	4.35	1.718
λ Sagittarii	2.9	18	22	32.398	+ 3.7027	−25	28	16.55	1.770
χ Draconis	3.7	18	22	38.745	− 1.0783	+72	41	41.40	1.605
c Serpentis	5.4	18	25	6.187	+ 3.1215	− 2	2	34.61	2.156
1 Aquilæ	4.1	18	30	25.097	+ 3.2646	− 8	18	22.80	+2.337
ζ Pavonis	4.1	18	32	45.334	7.0213	−71	30	17.78	2.691
α Lyræ (*Vega*)	0.1	18	33	57.538	2.0314	+38	42	4.37	3.240
2 Aquilæ	4.7	18	37	27.384	3.2866	− 9	8	14.99	3.256
φ Sagittarii	3.3	18	40	9.520	3.7488	−27	4	55.31	3.488
110 Herculis	4.3	18	41	52.419	+ 2.5803	+20	27	40.98	+3.299
6 Aquilæ	4.5	18	42	30.317	3.1829	− 4	50	33.99	3.674
λ Pavonis	4.4	18	44	3.956	5.5670	−62	17	22.18	3.808
β Lyræ †	*var.*	18	46	49.845	+ 2.2147	+33	15	35.76	4.063
50 Draconis	5.4	18	49	13.182	− 1.9183	+75	19	49.53	4.323
σ Sagittarii	2.1	18	49	48.514	+ 3.7202	−26	24	24.96	+4.248
ο Draconis †	4.8	18	49	54.290	0.8883	+59	16	49.96	4.354
θ Serpentis *pr.* †	4.5	18	51	50.671	2.9822	+ 4	5	18.09	4.524
R Lyræ †	*var.*	18	52	39.458	1.8260	+43	49	46.95	4.643
ε Aquilæ	4.2	18	55	37.691	2.7220	+14	56	53.00	4.737
γ Lyræ	3.3	18	55	39.080	+ 2.2434	+32	34	5.63	+4.814
ζ Sagittarii †	2.7	18	57	0.794	3.8182	−30	0	24.91	4.916
ζ Aquilæ	3.0	19	1	21.913	2.7569	+13	43	55.06	5.204
λ Aquilæ	3.6	19	1	34.733	3.1836	− 5	0	54.45	5.239
α Coronæ Australis	4.1	19	3	29.141	4.0835	−38	2	33.23	5.364
ι Lyræ	5.1	19	4	9.714	+ 2.1412	+35	57	41.87	+5.533
π Sagittarii	3.0	19	4	31.868	+ 3.5691	−21	9	51.35	5.534
λ Ursæ Minoris	6.6	19	8	36.99*	−70.8861	+89	0	33.82	5.919
ψ Sagittarii	4.9	19	10	8.728	+ 3.6804	−25	24	33.04	6.005
d Sagittarii	5.0	19	12	29.203	3.5111	−19	6	37.03	6.218
δ Draconis	3.2	19	12	32.302	+ 0.0230	+67	30	24.21	+6.327
θ Lyræ	4.5	19	13	18.784	2.0808	+37	58	35.60	6.310
ω Aquilæ	5.1	19	13	41.157	2.8159	+11	26	9.70	6.349
κ Cygni	4.0	19	15	4.191	+ 1.3880	+53	12	20.63	6.570
τ Draconis	4.6	19	17	15.213	− 1.1338	+73	11	32.69	6.739
σ Octantis	5.5	19	19	42.17*	+97.2199	−89	14	4.37	+6.830
δ Aquilæ	3.4	19	21	3.694	3.0250	+ 2	56	19.04	7.025
β Cygni †	3.2	19	27	10.332	2.4189	+27	46	27.20	7.432
ι Cygni	3.9	19	27	29.269	1.5134	+51	32	30.91	7.596
μ Aquilæ	4.6	19	29	47.457	2.9312	+ 7	11	29.51	7.508
h Sagittarii	4.7	19	31	21.193	+ 3.6534	−25	4	43.02	+7.754
κ Aquilæ	5.0	19	32	9.494	3.2290	− 7	13	25.43	7.847
θ Cygni	4.6	19	34	4.919	1.6090	+50	1	0.78	8.250
54 Sagittarii	5.4	19	35	40.973	3.4390	−16	29	44.78	8.081
β Sagittæ	4.4	19	37	5.774	2.6939	+17	16	17.58	8.209
15 Cygni	5.0	19	41	6.213	+ 2.1640	+37	8	28.97	+8.600
f Sagittarii	5.1	19	41	13.788	3.5018	−19	58	24.02	8.481
γ Aquilæ	2.8	19	42	4.558	+ 2.8520	+10	23	53.27	+8.633

β Lyræ, var., $12^d.9$, $3^m.4$–$4^m.1$, star 7^m, 46″ s. f.
ο Draco., star $7^m.6$, 32″.1, n. pr.
θ Serpentis, star $5^m.4$, 22″.2 s. f.
R. Lyræ, var., $46^d.4$, $4^m.0$–$4^m.7$
ζ Sag., binary $3^m.4$, $3^m.6$, 0″.5
β Cygni, star $5^m.4$, 34″.7 n. f.

WASHINGTON, JANUARY $1^d.006$.

Name of Star.	Magnitude.	Right Ascension.	Annual Variation.	Declination.	Annual Variation.
		h m s	s	° ′ ″	″
δ Cygni . . . †	3.0	19 42 13.517	+1.8760	+44 54 55.75	+ 8.692
δ Sagittæ . . .	3.8	19 43 27.840	2.6748	+18 18 59.76	8.762
α Aquilæ (*Altair*) .	0.9	19 46 29.388	2.9272	+ 8 38 6.74	9.361
η Aquilæ . . . †	*var.*	19 47 59.436	+3.0569	+ 0 46 44.84	9.092
ε Draconis . . †	4.0	19 48 28.687	−0.1863	+70 2 37.58	9.164
ι Sagittarii . .	4.2	19 49 11.495	+4.1439	−42 6 0.95	+ 9.238
ε Pavonis . . .	4.1	19 50 25.767	6.9922	−73 8 37.63	9.170
β Aquilæ . . .	3.9	19 50 59.441	2.9468	+ 6 11 10.77	8.852
γ Sagittæ . . .	3.7	19 54 50.594	2.6673	+19 15 9.13	9.655
c Sagittarii . .	4.6	19 57 14.942	3.6933	−27 57 18.84	9.827
τ Aquilæ . . .	5.6	19 59 50.482	+2.9308	+ 7 1 45.12	+10.040
θ Aquilæ . . .	3.4	20 6 45.891	3.0961	− 1 4 59.21	10.536
o Cygni *seq.* . . †	4.0	20 10 51.681	+1.8901	+46 28 26.49	10.839
κ Cephei . . . †	4.4	20 11 52.353	−1.9603	+77 26 48.54	10.934
24 Vulpeculæ . .	5.4	20 13 1.172	+2.5673	+24 23 58.06	10.981
α^2 Capricorni . . †	3.8	20 13 10.393	+3.3307	−12 49 5.65	+11.011
β Capricorni . . †	3.2	20 16 4.133	3.3736	−15 3 35.65	11.221
α Pavonis . . .	2.1	20 18 41.515	4.7661	−57 1 4.50	11.312
γ Cygni . . .	2.3	20 19 4.185	2.1526	+39 58 28.28	11.432
π Capricorni . . †	5.2	20 22 17.132	3.4367	−18 30 2.63	11.658
ρ Capricorni . . †	5.0	20 23 50.567	+3.4249	−18 6 18.82	+11.751
41 Cygni . . .	4.1	20 25 48.040	2.4515	+30 4 27.91	11.908
θ Cephei . . .	4.3	20 28 6.457	1.0122	+62 41 52.96	12.054
ε Delphini . . .	4.0	20 29 0.545	+2.8664	+11 0 12.82	12.109
Groombridge 3241 .	6.4	20 30 23.715	−0.2366	+72 14 0.94	12.212
α Indi . . .	3.2	20 31 22.810	+4.2310	−47 35 57.06	+12.352
β Delphini . . . †	3.7	20 33 25.384	2.8138	+14 17 18.38	12.404
υ Capricorni . .	5.3	20 35 2.514	3.4184	−18 26 56.22	12.542
α Delphini . . .	3.9	20 35 33.054	2.7868	+15 36 4.56	12.602
β Pavonis . . .	3.6	20 37 2.462	5.4467	−66 31 13.39	12.683
α Cygni . . .	1.3	20 38 25.895	+2.0447	+44 57 55.48	+12.777
δ Delphini . . .	4.5	20 39 21.040	2.8008	+14 45 29.59	12.792
ψ Capricorni . .	4.3	20 40 53.268	3.5571	−25 35 15.22	12.797
γ Delphini *seq.* . . †	4.5	20 42 34.532	2.7831	+15 48 23.84	12.861
ε Cygni . . .	2.6	20 42 39.032	2.4274	+33 38 24.51	13.388
ε Aquarii . . .	3.8	20 42 54.807	+3.2495	− 9 49 6.46	+13.049
η Cephei . . .	3.6	20 43 30.103	1.2250	+61 29 48.32	13.938
μ Aquarii . . .	4.8	20 47 54.517	3.2380	− 9 18 51.06	13.369
β Indi . . .	3.7	20 47 56.418	+4.7137	−58 47 12.05	13.401
76 Draconis . .	5.7	20 49 1.268	−4.1410	+82 12 22.39	13.505
32 Vulpeculæ . .	5.2	20 50 48.556	+2.5562	+27 43 20.88	+13.599
220 Draconis (Heis) .	5.6	20 51 36.854	−2.6187	+80 13 22.27	13.621
ν Cygni . . .	4.0	20 53 53.512	+2.2354	+40 49 40.27	13.774
α Octantis . . .	5.2	20 54 5.496	7.3929	−77 21 38.62	13.415
γ Microscopii . .	4.7	20 55 53.826	3.6873	−32 36 8.18	13.914
θ Capricorni . .	4.2	21 1 0.124	+3.3758	−17 34 59.44	+14.170
ξ Cygni . . .	3.9	21 1 43.768	2.1812	+43 34 35.20	14.289
61 Cygni *pr.* . .	5.6	21 2 57.039	+2.6851	+38 18 58.07	+17.603

δ Cygni, comp. 8^m, $1''.6$ n. pr.
η Aquilæ, var., $7^d.18$, $3^m.7$–$4^m.4$
ε Draconis, *comp.,* $7^m.6$, $3''.1$ n.
o Cygni, star $5^m.0$ *pr.* 19^s, $270''$ ***n., star*** $7^m.8$ *f.* $1'$, $96''$*s.*

κ Cephei, comp. 8^m, $7''.5$ s. f.
α^2 Capricor., α^1 Capricor., $4^m.6$ pr. 24^s $137''$ n.
β Capricor., star $6^m.2$ pr. 14^s, $10''$s.

π Capricor., comp. 9^m, $3''.4$, s. f.
ρ Capricor., comp. $7^m.6$, $2''.8$ s.
β Delphini, binary $4^m.1$, $5^m.4$ $0''.5$
γ Delphini, comp. $5^m.5$, $11''.2$

Name of Star.	Magnitude.	Right Ascension.	Annual Variation.	Declination.	Annual Variation.
		h m s	s	° ′ ″	″
61 Cygni *seq.*	6.3	Δα+1.552	. . . .	Δδ−15.65	. . . .
ν Aquarii	4.5	21 4 48.096	+ 3.2703	−11 43 42.38	+14.462
Bradley 2777	5.9	21 7 16.903	− 1.1361	+77 46 10.89	14.647
3 Piscis Australis	5.6	21 8 4.389	+ 3.5640	−27 58 43.68	14.559
ζ Cygni	3.4	21 9 11.416	2.5519	+29 51 55.65	14.670
τ Cygni †	3.8	21 11 16.666	+ 2.3939	+37 40 9.64	+15.288
α Equulei	4.1	21 11 25.510	2.9993	+ 4 53 0.68	14.778
σ Cygni	4.3	21 13 57.527	2.3546	+39 1 32.03	15.014
θ¹ Microscopii	4.9	21 15 8.064	3.8457	−41 10 55.50	15.084
α Cephei	2.6	21 16 28.848	1.4351	+62 12 44.88	15.206
ι Capricorni	4.3	21 17 20.930	+ 3.3445	−17 12 35.40	+15.209
1 Pegasi	4.2	21 18 0.994	2.7740	+19 25 39.13	15.308
γ Pavonis	4.3	21 19 10.863	5.0045	−65 45 54.79	16.094
ζ Capricorni	3.9	21 21 38.741	3.4308	−22 47 34.78	15.468
g Cygni †	5.3	21 26 12.078	2.2125	+46 9 8.08	15.804
β Aquarii	3.1	21 26 55.643	+ 3.1601	− 5 57 31.79	+15.728
β Cephei †	3.3	21 27 31.801	0.7871	+70 10 27.33	15.776
ξ Aquarii	4.8	21 33 4.111	3.1959	− 8 14 57.53	16.042
74 Cygni	5.1	21 33 25.274	2.4031	+40 1 4.02	16.093
γ Capricorni	3.8	21 35 13.040	3.3276	−17 3 36.73	16.160
λ Octantis †	5.4	21 37 31.844	+ 9.5662	−83 7 28.51	+16.283
ε Pegasi	2.5	21 39 51.822	2.9462	+ 9 28 15.89	16.413
11 Cephei	4.8	21 40 38.174	0.8891	+70 54 21.77	16.545
δ Capricorni	3.0	21 42 11.127	3.3145	−16 31 37.46	16.232
π² Cygni	4.3	21 43 32.467	2.2143	+48 54 7.44	16.595
μ Capricorni	5.2	21 48 29.976	+ 3.2734	−13 57 59.64	+16.836
γ Gruis	3.2	21 48 36.208	3.6422	−37 46 45.32	16.820
16 Pegasi	5.0	21 49 3.440	2.7282	+25 30 38.84	16.868
79 Draconis	6.6	21 51 45.652	0.7203	+73 17 8.97	17.004
ε Indi	4.7	21 56 38.054	4.6119	−57 8 52.83	14.636
20 Pegasi	5.7	21 56 48.105	+ 2.9221	+12 41 52.69	+17.165
α Aquarii	3.2	22 1 15.885	3.0822	− 0 44 51.71	17.413
ι Aquarii	4.4	22 1 41.149	3.2429	−14 17 49.28	17.372
20 Cephei	5.4	22 2 20.008	1.8226	+62 21 21.61	17.512
α Gruis	2.2	22 2 41.506	3.7951	−47 23 15.97	17.302
ι Pegasi	4.0	22 2 54.820	+ 2.7913	+24 54 53.64	+17.507
θ Pegasi	3.7	22 5 45.672	3.0268	+ 5 45 52.60	17.642
π Pegasi	4.4	22 6 4.683	2.6624	+32 44 45.83	17.601
ζ Cephei	3.6	22 7 47.975	2.0777	+57 46 2.13	17.701
24 Cephei	5.0	22 8 7.096	1.1584	+71 54 27.07	17.708
θ Aquarii	4.3	22 12 11.459	+ 3.1674	− 8 13 18.41	+17.850
α Tucanæ	2.9	22 12 28.819	4.1374	−60 41 54.31	17.846
υ Octantis	5.7	22 15 6.74*	12.4599	−86 24 57.52	18.057
γ Aquarii	4.0	22 17 6.690	3.0992	− 1 49 51.62	18.075
31 Pegasi	4.9	22 17 11.196	2.9529	+11 45 41.14	18.069
3 Lacertæ	4.6	22 20 5.858	+ 2.3551	+51 47 16.43	+17.983
π Aquarii	4.6	22 20 46.972	3.0638	+ 0 55 49.70	18.196
σ Aquarii	4.9	22 25 59.505	+ 3.1774	−11 7 42.68	+18.357

τ Cygni, comp. 7^{m}, 0″.8 pr.
g Cygni, star $6^{m}.7$ f. 10^{s}, 420″ s.

β Cephei, star 8^{m}, 13″.3 s. pr.

λ Octantis, **binary** $5^{m}.5$, $8^{m}.0$, 3″.2 n. f.

WASHINGTON, JANUARY $1^d.006$.

Name of Star.	Magnitude.	Right Ascension.			Annual Variation.	Declination.			Annual Variation.
		h	m	s	s	°	′	″	″
α Lacertæ	3.8	22	27	39.860	+2.4675	+49	49	47.14	+18.454
υ Aquarii	5.3	22	29	52.874	3.2855	−21	9	33.92	18.362
226 B. Cephei	5.7	22	30	43.907	1.0659	+75	46	22.29	18.544
η Aquarii	4.1	22	30	50.089	3.0833	− 0	34	16.79	18.495
10 Lacertæ	4.9	22	35	18.659	2.6885	+38	35	31.02	18.681
ε Piscis Australis	4.2	22	35	47.432	+3.3233	−27	30	11.01	+18.697
ζ Pegasi	3.6	22	37	4.368	2.9914	+10	22	17.98	18.734
β Octantis	4.3	22	37	7.388	6.3409	−81	50	36.14	18.751
β Gruis	2.2	22	37	25.059	3.5973	−47	20	42.65	18.732
η Pegasi	3.1	22	38	52.520	2.8088	+29	45	38.21	18.766
λ Pegasi	4.1	22	42	17.448	+2.8867	+23	6	8.28	+18.896
ε Gruis	3.7	22	43	14.643	3.6397	−51	46	47.16	18.873
τ Aquarii	4.2	22	44	56.061	3.1794	−14	3	26.17	18.947
μ Pegasi	3.7	22	45	45.283	2.8929	+24	8	12.00	18.961
ι Cephei	3.7	22	46	32.669	2.1274	+65	44	14.47	18.899
λ Aquarii	3.8	22	48	1.458	+3.1311	− 8	2	53.22	+19.101
ρ Indi	6.1	22	48	32.870	4.2197	−70	32	38.72	19.133
δ Aquarii	3.5	22	49	58.875	3.1866	−16	17	20.58	19.092
α Pisc. Aust. (*Fomalhaut*)	1.3	22	52	47.444	3.3216	−30	5	20.09	19.019
ο Andromedæ	3.6	22	57	52.143	2.7540	+41	51	10.16	19.304
β Pegasi . †	*var.*	22	59	30.382	+2.9048	+27	36	18.78	+19.486
α Pegasi (*Markab*)	2.6	23	0	22.571	2.9862	+14	43	53.74	19.332
55 Pegasi	4.7	23	2	34.238	3.0208	+ 8	56	1.92	19.407
c^2 Aquarii	3.8	23	4	45.366	3.2024	−21	39	1.20	19.508
π Cephei . †	4.6	23	5	5.738	1.8987	+74	54	41.86	19.441
ι Gruis	4.1	23	5	22.886	+3.4082	−45	43	24.94	+19.448
59 Pegasi	5.2	23	7	17.581	3.0277	+ 8	14	31.55	19.522
5 Cassiopeiæ (Heis)	5.6	23	9	2.504	2.8776	+56	40	56.72	19.851
φ Aquarii	4.4	23	9	45.914	3.1073	− 6	31	24.93	19.372
ψ Aquarii . †	4.5	23	11	16.942	3.1450	− 9	34	1.94	19.589
γ Tucanæ	4.1	23	12	17.952	+3.5214	−58	43	7.14	+19.673
γ Piscium	3.8	23	12	36.184	3.1094	+ 2	48	4.74	19.639
γ Sculptoris	4.5	23	14	4.459	3.2455	−33	0	41.79	19.579
ο Cephei . †	4.9	23	15	0.413	2.4505	+67	37	47.67	19.678
τ Pegasi	4.6	23	16	16.757	2.9654	+23	15	30.50	19.670
b^1 Aquarii	4.2	23	18	20.996	+3.1534	−20	34	52.21	+19.626
4 Cassiopeiæ	5.2	23	20	55.341	2.6492	+61	47	58.46	19.745
υ Pegasi	4.6	23	20	59.114	2.9902	+22	55	9.99	19.786
κ Piscium	4.9	23	22	25.283	3.0752	+ 0	46	25.64	19.684
θ Piscium	4.4	23	23	30.208	3.0419	+ 5	53	43.98	19.751
70 Pegasi	4.7	23	24	42.178	+3.0319	+12	16	29.87	+19.844
39 H. Cephei	5.6	23	27	45.399	−0.2393	+86	49	19.56	19.868
β Sculptoris	4.5	23	28	15.332	+3.2254	−38	18	18.71	19.859
72 Pegasi (*mean*) . †	5.2	23	29	35.074	2.9704	+30	50	22.56	19.860
λ Andromedæ	4.0	23	33	15.188	2.9273	+45	58	52.76	19.489
ι Andromedæ	4.3	23	33	48.994	+2.9341	+42	46	50.99	+19.915
ι Piscium	4.3	23	35	25.403	3.0843	+ 5	8	57.30	19.495
γ Cephei	3.4	23	35	43.667	+2.4364	+77	8	28.37	+20.091

β Pegasi, var. irreg., $2^m.2$–$2^m.7$ / π Cephei, *comp.* 7^m, $0''.9$ n. f. | ψ Aquarii, star $8^m.5$, $49''.4$ n. pr. / ο Cephei, comp. 8^m, $2''.9$ s. pr. | 72 Pegasi, $6^m.0$, $6^m.0$, $0''.4$

WASHINGTON, JANUARY $1^d.006$.

Name of Star.	Magnitude.	Right Ascension.	Annual Variation.	Declination.	Annual Variation.
		h m s	s	° ′ ″	″
κ Andromedæ	4.3	23 36 4.198	+ 2.9466	+43 50 47.57	+19.911
ω^2 Aquarii	4.6	23 38 9.579	3.1130	−15 1 53.23	19.892
ι^1 Aquarii	5.3	23 39 38.324	3.1147	−18 45 55.73	19.961
ψ Andromedæ	5.1	23 41 40.149	2.9628	+45 55 53.72	19.974
41 H. Cephei	5.0	23 43 41.725	2.8476	+67 19 3.96	19.985
δ Sculptoris	4.6	23 44 20.601	+ 3.1282	−28 37 2.21	+19.866
γ^1 Octantis	5.1	23 46 58.337	3.6252	−82 30 28.43	20.002
ϕ Pegasi	5.2	23 48 0.540	3.0477	+18 37 53.50	19.979
ρ Cassiopeiæ	4.8	23 49 58.804	2.9803	+57 0 35.34	20.028
Groombridge 4163	6.6	23 50 32.067	2.8772	+73 55 14.10	20.024
ω Piscium	4.0	23 54 47.500	+ 3.0794	+ 6 22 34.25	+19.933
ε Tucanæ	4.7	23 55 21.044	3.1412	−66 3 59.20	20.034
30 Piscium	4.7	23 57 26.828	3.0772	− 6 30 11.24	20.007
2 Ceti	4.6	23 59 13.962	+ 3.0755	−17 49 33.38	+20.033

NORTHERN CIRCUMPOLARS.

Name of Star.	Magnitude.	Right Ascension.	Annual Variation.	Declination.	Annual Variation.
43 H. Cephei	4.5	0 56 31.244	+ 7.5725	+85 47 8.15	+19.435
α Ursæ Minoris (*Polaris*)	2.1	1 27 51.07*	27.8225	+88 50 10.77	18.594
Groombridge 750	6.7	4 8 34.697	17.5285	+85 19 23.58	9.409
Groombridge 944	6.4	5 33 38.985	18.7487	+85 9 19.11	+ 2.296
51 H. Cephei	5.3	6 59 37.82*	29.3185	+87 11 21.21	− 5.192
Groombridge 1119	7.0	8 10 44.772	+61.5386	+88 53 55.27	−10.808
1 H. Draconis	4.6	9 24 37.695	8.8239	+81 42 59.81	15.640
30 H. Camelop.	5.3	10 20 26.885	7.6113	+83 0 25.01	18.176
Bradley 1672	6.3	12 14 26.635	+ 0.3397	+88 11 15.83	19.948
Groombridge 2283	7.2	15 5 18.999	−19.7324	+87 34 19.83	13.810
ε Ursæ Minoris	4.4	16 54 56.786	− 6.2674	+82 11 0.93	− 5.614
δ Ursæ Minoris	4.4	18 0 38.79*	19.4977	+86 36 51.01	+ 0.104
λ Ursæ Minoris	6.6	19 8 36.99*	70.8861	+89 0 33.82	5.919
76 Draconis	5.7	20 49 1.268	4.1410	+82 12 22.39	13.505
39 H. Cephei	5.6	23 27 45.399	− 0.2393	+86 49 19.56	+19.868

SOUTHERN CIRCUMPOLARS.

Name of Star.	Magnitude.	Right Ascension.	Annual Variation.	Declination.	Annual Variation.
4 Octantis (G.)	5.6	1 42 21.27*	− 3.8135	−85 12 52.03	+18.107
31 Mensæ (G.)	6.2	5 47 13.194	11.6913	−84 49 53.11	+ 1.204
7 Octantis (G.)	6.4	7 18 1.35*	20.1468	−86 53 33.62	− 6.688
ζ Octantis	5.4	9 9 38.50*	8.0707	−85 18 43.98	14.716
η Octantis	6.3	10 59 57.052	− 0.3460	−84 7 13.77	19.366
ι Octantis	5.4	12 45 37.397	+ 5.9286	−84 38 44.23	−19.626
δ Octantis	4.1	14 12 41.586	9.2145	−83 15 57.15	−16.793
χ Octantis	5.2	18 3 13.216	35.7415	−87 39 53.25	+ 0.157
σ Octantis	5.5	19 19 42.17*	97.2199	−89 14 4.37	6.830
υ Octantis	5.7	22 15 6.74*	+12.4599	−86 24 57.52	+18.057

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

43 H. Cephei. Mag. 4.5			*α* **Ursæ Minoris.** (*Polaris.*) Mag. 2.1			**Groombridge 750.** Mag. 6.7			**Groombridge 944.** Mag. 6.4			**51 H. Cephei.** Mag. 5.3		
Mean Solar Date.	Right Ascension.	Declination *North.*	Mean Solar Date.	Right Ascension.	Declination *North.*	Mean Solar Date.	Right Ascension.	Declination *North.*	Mean Solar Date.	Right Ascension.	Declination *North.*	Mean Solar Date.	Right Ascension.	Declination *North.*
	h m	° ′		h m	° ′		h m	° ′		h m	° ′		h m	° ′
Jan.	0 56	+85 47	Jan.	1 27	+88 50	Jan.	4 8	+85 19	Jan.	5 33	+85 9	Jan.	7 0	+87 11
	s	″		s	″		s	″		s	″		s	″
0.3	25.29	27.24	0.3	39.34	30.68	0.4	42.61	40.86	0.5	51.04	31.52	0.5	3.66	27.05
1.3	25.06	27.34	1.3	38.51	30.80	1.4	42.54	41.14	1.5	51.06	31.80	1.5	3.83	27.31
2.3	24.82	27.46	2.3	37.65	30.95	2.4	42.47	41.43	2.4	51.09	32.10	2.5	4.02	27.58
3.3	24.56	27.58	3.3	36.72	31.13	3.4	42.39	41.73	3.4	51.12	32.43	3.5	4.23	27.88
4.3	24.27	27.70	4.3	35.71	31.31	4.4	42.30	42.05	4.4	51.13	32.78	4.5	4.44	28.22
5.2	23.96	27.81	5.3	34.62	31.48	5.4	42.19	42.38	5.4	51.13	33.14	5.5	4.62	28.57
6.2	23.63	27.90	6.3	33.45	31.62	6.4	42.06	42.71	6.4	51.10	33.51	6.5	4.76	28.95
7.2	23.29	27.96	7.3	32.25	31.73	7.4	41.91	43.02	7.4	51.05	33.88	7.5	4.85	29.32
8.2	22.96	27.99	8.3	31.06	31.81	8.4	41.74	43.31	8.4	50.98	34.23	8.5	4.91	29.67
9.2	22.65	28.00	9.3	29.92	31.86	9.4	41.56	43.57	9.4	50.90	34.55	9.5	4.95	30.02
10.2	22.35	28.00	10.3	28.84	31.90	10.4	41.38	43.80	10.4	50.82	34.84	10.5	4.96	30.35
11.2	22.07	27.97	11.3	27.82	31.92	11.4	41.22	44.01	11.4	50.74	35.12	11.5	4.96	30.65
12.2	21.81	27.95	12.3	26.85	31.96	12.4	41.07	44.22	12.4	50.66	35.39	12.5	4.97	30.93
13.2	21.56	27.94	13.2	25.91	32.00	13.4	40.93	44.43	13.4	50.60	35.65	13.5	5.00	31.21
14.2	21.31	27.94	14.2	24.97	32.05	14.4	40.79	44.64	14.4	50.54	35.91	14.5	5.04	31.49
15.2	21.05	27.95	15.2	24.02	32.10	15.4	40.65	44.87	15.4	50.48	36.18	15.5	5.09	31.79
16.2	20.78	27.97	16.2	23.03	32.17	16.4	40.50	45.09	16.4	50.42	36.47	16.5	5.14	32.09
17.2	20.50	27.99	17.2	21.99	32.23	17.3	40.35	45.33	17.4	50.36	36.78	17.5	5.19	32.41
18.2	20.20	28.00	18.2	20.90	32.29	18.3	40.18	45.59	18.4	50.29	37.10	18.5	5.23	32.75
19.2	19.89	28.00	19.2	19.76	32.34	19.3	40.00	45.86	19.4	50.21	37.42	19.5	5.24	33.10
20.2	19.57	27.98	20.2	18.57	32.38	20.3	39.80	46.12	20.4	50.11	37.74	20.5	5.24	33.46
21.2	19.25	27.93	21.2	17.36	32.39	21.3	39.58	46.36	21.4	49.99	38.06	21.5	5.20	33.83
22.2	18.93	27.86	22.2	16.15	32.38	22.3	39.36	46.58	22.4	49.84	38.37	22.5	5.14	34.19
23.2	18.62	27.77	23.2	14.96	32.34	23.3	39.13	46.78	23.4	49.69	38.66	23.5	5.04	34.53
24.2	18.33	27.67	24.2	13.83	32.30	24.3	38.90	46.95	24.4	49.54	38.92	24.4	4.92	34.85
25.2	18.05	27.56	25.2	12.77	32.23	25.3	38.68	47.10	25.4	49.39	39.16	25.4	4.81	35.15
26.2	17.80	27.45	26.2	11.78	32.16	26.3	38.47	47.24	26.4	49.25	39.38	26.4	4.69	35.44
27.2	17.56	27.35	27.2	10.86	32.11	27.3	38.28	47.37	27.4	49.12	39.59	27.4	4.58	35.70
28.2	17.33	27.27	28.2	9.98	32.06	28.3	38.10	47.51	28.4	49.00	39.80	28.4	4.49	35.97
29.2	17.09	27.20	29.2	9.09	32.05	29.3	37.93	47.66	29.4	48.89	40.02	29.4	4.44	36.23
30.2	16.84	27.14	30.2	8.16	32.04	30.3	37.75	47.83	30.4	48.79	40.26	30.4	4.39	36.50
31.2	16.57	27.09	31.2	7.15	32.04	31.3	37.55	48.02	31.4	48.69	40.53	31.4	4.34	36.81
32.2	16.29	27.03	32.2	6.06	32.03	32.3	37.35	48.22	32.4	48.57	40.81	32.4	4.28	37.14
	13.62	+13.59		49.49	+49.49		12.28	+12.24		11.85	+11.81		20.41	+20.39
	$0^h\ 56^m$	$31^s.244$		$1^h\ 27^m$	$51^s.07$		$4^h\ 8^m$	$34^s.697$		$5^h\ 33^m$	$38^s.985$		$6^h\ 59^m$	$37^s.82$
	+85° 47′	8″.15		+88° 50′	10″.77		+85° 19′	23″.58		+85° 9′	19″.11		+87° 11′	21″.21

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

43 H. Cephei. Mag. 4.5			**α Ursæ Minoris.** (*Polaris.*) Mag. 2.1			**Groombridge 750.** Mag. 6.7			**Groombridge 944.** Mag. 6.4			**51 H. Cephei.** Mag. 5.3		
Mean Solar Date.	**Right Ascension.**	**Declination *North*.**	**Mean Solar Date.**	**Right Ascension.**	**Declination *North*.**	**Mean Solar Date.**	**Right Ascension.**	**Declination *North*.**	**Mean Solar Date.**	**Right Ascension.**	**Declination *North*.**	**Mean Solar Date.**	**Right Ascension.**	**Declination *North*.**
	h m	° ′		h m	° ′		h m	° ′		h m	° ′		h m	° ′
Feb.	0 56	+85 47	Feb.	1 26	+88 50	Feb.	4 8	+85 19	Feb.	5 33	+85 9	Feb.	6 59	+87 11
	s	″		s	″		s	″		s	″		s	″
1.2	16.29	27.03	1.2	66.06	32.03	1.3	37.35	48.22	1.4	48.57	40.81	1.4	64.28	37.14
2.2	15.99	26.95	2.2	64.91	32.00	2.3	37.13	48.42	2.4	48.42	41.10	2.4	64.19	37.48
3.2	15.68	26.84	3.2	63.74	31.95	3.3	36.88	48.60	3.4	48.25	41.38	3.4	64.06	37.83
4.2	15.38	26.71	4.2	62.56	31.87	4.3	36.62	48.75	4.4	48.07	41.65	4.4	63.90	38.17
5.2	15.09	26.55	5.2	61.43	31.75	5.3	36.36	48.88	5.4	47.87	41.90	5.4	63.70	38.49
6.2	14.82	26.37	6.2	60.36	31.62	6.3	36.10	48.98	6.4	47.67	42.11	6.4	63.48	38.79
7.2	14.57	26.19	7.2	59.38	31.48	7.3	35.85	49.06	7.4	47.46	42.29	7.4	63.24	39.07
8.2	14.34	26.01	8.2	58.46	31.33	8.3	35.61	49.13	8.3	47.26	42.46	8.4	63.01	39.32
9.2	14.12	25.83	9.2	57.60	31.20	9.3	35.38	49.19	9.3	47.08	42.62	9.4	62.80	39.55
10.2	13.92	25.66	10.2	56.76	31.07	10.3	35.16	49.26	10.3	46.92	42.78	10.4	62.59	39.79
11.1	13.71	25.50	11.2	55.94	30.96	11.3	34.95	49.33	11.3	46.75	42.93	11.4	62.39	40.02
12.1	13.49	25.35	12.2	55.07	30.84	12.3	34.73	49.41	12.3	46.58	43.10	12.4	62.21	40.27
13.1	13.27	25.20	13.2	54.16	30.72	13.3	34.50	49.50	13.3	46.41	43.29	13.4	62.04	40.53
14.1	13.03	25.05	14.2	53.21	30.61	14.3	34.27	49.59	14.3	46.24	43.49	14.4	61.85	40.79
15.1	12.78	24.89	15.2	52.23	30.49	15.3	34.03	49.69	15.3	46.05	43.69	15.4	61.65	41.08
16.1	12.52	24.72	16.2	51.22	30.37	16.3	33.77	49.79	16.3	45.85	43.90	16.4	61.41	41.37
17.1	12.26	24.53	17.2	50.17	30.22	17.3	33.50	49.88	17.3	45.62	44.10	17.4	61.16	41.66
18.1	12.00	24.31	18.2	49.15	30.05	18.3	33.22	49.94	18.3	45.39	44.30	18.4	60.89	41.95
19.1	11.76	24.07	19.1	48.14	29.87	19.3	32.94	49.98	19.3	45.15	44.47	19.4	60.59	42.22
20.1	11.54	23.82	20.1	47.18	29.66	20.3	32.65	50.01	20.3	44.91	44.62	20.4	60.26	42.47
21.1	11.33	23.56	21.1	46.29	29.43	21.3	32.38	50.00	21.3	44.66	44.75	21.4	59.93	42.70
22.1	11.15	23.29	22.1	45.51	29.20	22.3	32.12	49.98	22.3	44.42	44.84	22.4	59.59	42.91
23.1	10.99	23.03	23.1	44.79	28.97	23.2	31.88	49.94	23.3	44.20	44.92	23.4	59.26	43.09
24.1	10.85	22.80	24.1	44.13	28.76	24.2	31.65	49.92	24.3	43.99	44.99	24.4	58.96	43.26
25.1	10.70	22.59	25.1	43.48	28.57	25.2	31.43	49.90	25.3	43.80	45.06	25.4	58.68	43.44
26.1	10.55	22.39	26.1	42.82	28.40	26.2	31.22	49.89	26.3	43.62	45.15	26.4	58.43	43.63
27.1	10.38	22.20	27.1	42.12	28.23	27.2	31.00	49.91	27.3	43.43	45.26	27.4	58.19	43.82
28.1	10.19	22.00	28.1	41.36	28.07	28.2	30.77	49.94	28.3	43.22	45.40	28.4	57.94	44.04
29.1	9.98	21.79	29.1	40.52	27.91	29.2	30.53	49.97	29.3	43.00	45.54	29.4	57.66	44.28
30.1	9.77	21.57	30.1	39.65	27.71	30.2	30.26	49.99	30.3	42.77	45.67	30.3	57.36	44.52
	13.62	+13.59		49.48	+49.47		12.28	+12.24		11.86	+11.82		20.43	+20.41
	$0^h\ 56^m$	$31^s.244$		$1^h\ 27^m$	$51^s.07$		$4^h\ 8^m$	$34^s.697$		$5^h\ 33^m$	$38^s.985$		$6^h\ 59^m$	$37^s.82$
+85° 47′		8″.15	+88° 50′		10″.77	+85° 19′		23″.58	+85° 9′		19″.11	+87° 11′		21″.21

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

43 H. Cephei. Mag. 4.5			**α Ursæ Minoris.** (*Polaris.*) Mag. 2.1			**Groombridge 750.** Mag. 6.7			**Groombridge 944.** Mag. 6.4			**51 H. Cephei.** Mag. 5.3		
Mean Solar Date.	Right Ascension.	Declination *North.*	Mean Solar Date.	Right Ascension.	Declination *North.*	Mean Solar Date.	Right Ascension.	Declination *North.*	Mean Solar Date.	Right Ascension.	Declination *North.*	Mean Solar Date.	Right Ascension.	Declination *North.*
	h m	° ′		h m	° ′		h m	° ′		h m	° ′		h m	° ′
Mar.	0 56	+85 47	Mar.	1 26	+88 50	Mar.	4 8	+85 19	Mar.	5 33	+85 9	Mar.	6 59	+87 11
	s	″		s	″		s	″		s	″		s	″
1.1	9.77	21.57	1.1	39.65	27.71	1.2	30.26	49.99	1.3	42.77	45.67	1.3	57.36	44.52
2.1	9.56	21.31	2.1	38.77	27.49	2.2	29.99	49.99	2.3	42.53	45.80	2.3	57.02	44.76
3.1	9.37	21.03	3.1	37.94	27.24	3.2	29.71	49.97	3.3	42.27	45.90	3.3	56.64	44.98
4.1	9.20	20.74	4.1	37.18	26.96	4.2	29.43	49.91	4.3	42.00	45.97	4.3	56.24	45.18
5.1	9.06	20.43	5.1	36.51	26.68	5.2	29.16	49.82	5.3	41.73	46.01	5.3	55.84	45.35
6.1	8.94	20.11	6.1	35.91	26.40	6.2	28.90	49.71	6.3	41.47	46.03	6.3	55.44	45.49
7.1	8.83	19.81	7.1	35.39	26.13	7.2	28.66	49.61	7.3	41.23	46.04	7.3	55.05	45.61
8.1	8.73	19.52	8.1	34.91	25.85	8.2	28.44	49.50	8.3	41.00	46.04	8.3	54.67	45.72
9.1	8.64	19.25	9.1	34.45	25.60	9.2	28.23	49.40	9.3	40.77	46.04	9.3	54.32	45.83
10.1	8.55	18.99	10.1	33.98	25.35	10.2	28.02	49.31	10.3	40.55	46.05	10.3	53.98	45.94
11.1	8.46	18.74	11.1	33.48	25.12	11.2	27.80	49.23	11.3	40.34	46.07	11.3	53.64	46.06
12.1	8.36	18.49	12.1	32.96	24.89	12.2	27.57	49.15	12.3	40.12	46.10	12.3	53.30	46.20
13.1	8.24	18.23	13.1	32.39	24.65	13.2	27.34	49.08	13.3	39.90	46.13	13.3	52.95	46.35
14.1	8.10	17.96	14.1	31.80	24.40	14.2	27.10	49.00	14.3	39.67	46.18	14.3	52.60	46.50
15.1	7.97	17.68	15.1	31.18	24.15	15.2	26.85	48.93	15.3	39.42	46.23	15.3	52.23	46.66
16.1	7.83	17.39	16.1	30.57	23.87	16.2	26.60	48.84	16.2	39.17	46.26	16.3	51.83	46.81
17.1	7.71	17.08	17.1	29.98	23.57	17.2	26.34	48.73	17.2	38.90	46.28	17.3	51.40	46.95
18.1	7.60	16.75	18.1	29.44	23.27	18.2	26.08	48.59	18.2	38.62	46.27	18.3	50.96	47.07
19.0	7.52	16.41	19.1	28.98	22.94	19.2	25.83	48.44	19.2	38.35	46.24	19.3	50.49	47.16
20.0	7.48	16.07	20.1	28.61	22.61	20.2	25.60	48.27	20.2	38.09	46.18	20.3	50.04	47.24
21.0	7.46	15.74	21.1	28.34	22.28	21.2	25.38	48.08	21.2	37.84	46.10	21.3	49.61	47.28
22.0	7.43	15.42	22.1	28.12	21.97	22.2	25.17	47.88	22.2	37.61	46.01	22.3	49.20	47.30
23.0	7.42	15.12	23.1	27.96	21.67	23.2	24.99	47.69	23.2	37.39	45.92	23.3	48.81	47.32
24.0	7.41	14.84	24.1	27.80	21.40	24.2	24.82	47.53	24.2	37.20	45.84	24.3	48.44	47.34
25.0	7.39	14.58	25.1	27.60	21.15	25.2	24.65	47.38	25.2	37.01	45.78	25.3	48.09	47.38
26.0	7.36	14.34	26.0	27.37	20.91	26.2	24.47	47.25	26.2	36.81	45.74	26.3	47.75	47.44
27.0	7.31	14.09	27.0	27.04	20.66	27.2	24.28	47.14	27.2	36.61	45.72	27.3	47.41	47.52
28.0	7.24	13.81	28.0	26.67	20.40	28.2	24.08	47.02	28.2	36.39	45.69	28.3	47.03	47.60
29.0	7.16	13.51	29.0	26.29	20.11	29.2	23.86	46.87	29.2	36.15	45.66	29.3	46.63	47.68
30.0	7.10	13.19	30.0	25.96	19.80	30.2	23.63	46.70	30.2	35.89	45.60	30.3	46.19	47.75
31.0	7.06	12.85	31.0	25.68	19.47	31.1	23.41	46.51	31.2	35.63	45.53	31.3	45.73	47.79
32.0	7.04	12.50	32.0	25.48	19.14	32.1	23.21	46.28	32.2	35.38	45.42	32.3	45.26	47.81
	13.62	+13.58		49.40	+49.39		12.28	+12.24		11.86	+11.82		20.45	+20.42
$0^h\ 56^m\ 31^s.244$			$1^h\ 27^m\ 51^s.07$			$4^h\ 8^m\ 34^s.697$			$5^h\ 33^m\ 38^s.985$			$6^h\ 59^m\ 37^s.82$		
+85° 47′ 8″.15			+88° 50′ 10″.77			+85° 19′ 23″.58			+85° 9′ 19″.11			+87° 11′ 21″.21		

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

43 H. Cephei. Mag. 4.5			**α Ursæ Minoris.** (*Polaris.*) Mag. 2.1			**Groombridge 750.** Mag. 6.7			**Groombridge 944.** Mag. 6.4			**51 H. Cephei.** Mag. 5.3		
Mean Solar Date.	**Right Ascension.**	**Declination *North*.**	**Mean Solar Date.**	**Right Ascension.**	**Declination *North*.**	**Mean Solar Date.**	**Right Ascension.**	**Declination *North*.**	**Mean Solar Date.**	**Right Ascension.**	**Declination *North*.**	**Mean Solar Date.**	**Right Ascension.**	**Declination *North*.**
	h m	° ′		h m	° ′		h m	° ′		h m	° ′		h m	° ′
Apr.	0 56	+85 47	Apr.	1 26	+88 50	Apr.	4 8	+85 19	Apr.	5 33	+85 9	Apr.	6 59	+87 11
	s	″		s	″		s	″		s	″		s	″
1.0	7.04	12.50	1.0	25.48	19.14	1.1	23.21	46.28	1.2	35.38	45.42	1.3	45.26	47.81
2.0	7.06	12.16	2.0	25.38	18.79	2.1	23.02	46.04	2.2	35.13	45.28	2.3	44.80	47.80
3.0	7.11	11.83	3.0	25.36	18.46	3.1	22.84	45.80	3.2	34.90	45.13	3.3	44.35	47.76
4.0	7.17	11.51	4.0	25.39	18.13	4.1	22.68	45.55	4.2	34.69	44.97	4.3	43.92	47.70
5.0	7.24	11.21	5.0	25.46	17.83	5.1	22.52	45.31	5.2	34.49	44.81	5.3	43.51	47.65
5.9	7.30	10.92	6.0	25.52	17.54	6.1	22.38	45.08	6.2	34.30	44.66	6.3	43.13	47.60
6.9	7.35	10.64	7.0	25.56	17.25	7.1	22.25	44.86	7.2	34.12	44.52	7.2	42.77	47.56
7.9	7.39	10.37	8.0	25.58	16.98	8.1	22.11	44.65	8.2	33.94	44.39	8.2	42.40	47.52
8.9	7.43	10.10	9.0	25.58	16.70	9.1	21.97	44.45	9.2	33.75	44.27	9.2	42.03	47.51
9.9	7.46	9.83	10.0	25.53	16.44	10.1	21.82	44.25	10.2	33.55	44.16	10.2	41.65	47.50
10.9	7.49	9.55	11.0	25.48	16.15	11.1	21.67	44.06	11.2	33.35	44.05	11.2	41.26	47.48
11.9	7.51	9.27	12.0	25.40	15.85	12.1	21.51	43.85	12.2	33.14	43.93	12.2	40.86	47.47
12.9	7.54	8.97	13.0	25.35	15.53	13.1	21.34	43.63	13.2	32.92	43.80	13.2	40.44	47.46
13.9	7.58	8.65	13.9	25.34	15.21	14.1	21.17	43.38	14.2	32.70	43.66	14.2	40.00	47.43
14.9	7.63	8.32	14.9	25.41	14.87	15.1	21.01	43.11	15.2	32.48	43.49	15.2	39.54	47.37
15.9	7.71	7.99	15.9	25.55	14.54	16.1	20.87	42.82	16.2	32.26	43.29	16.2	39.09	47.28
16.9	7.83	7.67	16.9	25.78	14.20	17.1	20.74	42.52	17.2	32.05	43.07	17.2	38.66	47.16
17.9	7.96	7.36	17.9	26.09	13.86	18.1	20.63	42.23	18.2	31.87	42.84	18.2	38.25	47.03
18.9	8.10	7.07	18.9	26.45	13.56	19.1	20.54	41.94	19.2	31.72	42.60	19.2	37.87	46.88
19.9	8.25	6.81	19.9	26.85	13.28	20.1	20.47	41.65	20.2	31.58	42.38	20.2	37.52	46.74
20.9	8.39	6.57	20.9	27.22	13.02	21.1	20.41	41.39	21.2	31.45	42.17	21.2	37.21	46.61
21.9	8.51	6.35	21.9	27.55	12.78	22.1	20.34	41.15	22.1	31.32	41.98	22.2	36.90	46.50
22.9	8.62	6.13	22.9	27.80	12.55	23.1	20.27	40.92	23.1	31.19	41.80	23.2	36.60	46.40
23.9	8.71	5.90	23.9	28.01	12.31	24.1	20.19	40.70	24.1	31.05	41.64	24.2	36.28	46.33
24.9	8.80	5.65	24.9	28.19	12.04	25.1	20.09	40.48	25.1	30.89	41.48	25.2	35.93	46.25
25.9	8.88	5.39	25.9	28.36	11.77	26.1	19.98	40.24	26.1	30.72	41.31	26.2	35.55	46.16
26.9	8.98	5.10	26.9	28.58	11.46	27.1	19.88	39.98	27.1	30.54	41.12	27.2	35.15	46.06
27.9	9.10	4.80	27.9	28.88	11.14	28.1	19.77	39.69	28.1	30.36	40.89	28.2	34.75	45.94
28.9	9.26	4.50	28.9	29.28	10.82	29.1	19.68	39.37	29.1	30.19	40.63	29.2	34.35	45.78
29.9	9.44	4.22	29.9	29.76	10.50	30.1	19.61	39.04	30.1	30.04	40.36	30.2	33.96	45.59
30.9	9.63	3.96	30.9	30.31	10.19	31.1	19.57	38.71	31.1	29.90	40.08	31.2	33.60	45.39
31.9	9.84	3.72	31.9	30.91	9.92	32.1	19.54	38.39	32.1	29.77	39.80	32.2	33.26	45.19
	13.61	+13.57		49.29	+49.28		12.28	+12.24		11.86	+11.82		20.45	+20.43
	$0^h\ 56^m\ 31^s.244$			$1^h\ 27^m\ 51^s.07$			$4^h\ 8^m\ 34^s.697$			$5^h\ 33^m\ 38^s.985$			$6^h\ 59^m\ 37^s.82$	
		+85° 47′ 8″.15			+88° 50′ 10″.77			+85° 19′ 23″.58			+85° 9′ 19″.11			+87° 11′ 21″.21

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

43 H. Cephei. Mag. 4.5			**α Ursæ Minoris.** (*Polaris.*) Mag. 2.1			**Groombridge 750.** Mag. 6.7			**Groombridge 944.** Mag. 6.4			**51 H. Cephei.** Mag. 5.3		
Mean Solar Date.	**Right Ascension.**	**Declination** ***North.***	**Mean Solar Date.**	**Right Ascension.**	**Declination** ***North.***	**Mean Solar Date.**	**Right Ascension.**	**Declination** ***North.***	**Mean Solar Date.**	**Right Ascension.**	**Declination** ***North.***	**Mean Solar Date.**	**Right Ascension.**	**Declination** ***North.***
	h m	° ′		h m	° ′		h m	° ′		h m	° ′		h m	° ′
May	0 56	+85 46	May	1 26	+88 50	May	4 8	+85 19	May	5 33	+85 9	May	6 59	+87 11
	s	″		s	″		s	″		s	″		s	″
1.9	9.84	63.72	1.9	30.91	9.92	1.1	19.57	38.71	1.1	29.90	40.08	1.2	33.60	45.39
2.9	10.04	63.49	2.9	31.51	9.66	2.1	19.54	38.39	2.1	29.77	39.80	2.2	33.26	45.19
3.9	10.24	63.28	3.9	32.10	9.42	3.1	19.52	38.08	3.1	29.67	39.53	3.2	32.95	44.97
4.9	10.43	63.07	4.9	32.67	9.18	4.1	19.52	37.79	4.1	29.58	39.27	4.2	32.66	44.77
5.9	10.61	62.87	5.9	33.20	8.95	5.1	19.51	37.51	5.1	29.50	39.02	5.2	32.38	44.59
6.9	10.78	62.67	6.9	33.68	8.73	6.0	19.49	37.25	6.1	29.41	38.79	6.2	32.11	44.42
7.9	10.94	62.48	7.9	34.13	8.50	7.0	19.47	36.98	7.1	29.32	38.56	7.2	31.83	44.25
8.9	11.10	62.27	8.9	34.57	8.27	8.0	19.44	36.72	8.1	29.22	38.35	8.2	31.55	44.10
9.9	11.25	62.05	9.9	35.03	8.02	9.0	19.40	36.47	9.1	29.11	38.13	9.2	31.26	43.94
10.9	11.41	61.82	10.9	35.50	7.76	10.0	19.36	36.20	10.1	29.00	37.91	10.2	30.95	43.78
11.9	11.59	61.58	11.9	36.03	7.50	11.0	19.33	35.92	11.1	28.88	37.67	11.2	30.62	43.61
12.9	11.80	61.33	12.9	36.63	7.22	12.0	19.30	35.63	12.1	28.76	37.41	12.2	30.28	43.42
13.9	12.03	61.09	13.9	37.32	6.95	13.0	19.28	35.31	13.1	28.64	37.12	13.1	29.94	43.21
14.9	12.28	60.87	14.9	38.08	6.71	14.0	19.28	34.98	14.1	28.54	36.82	14.1	29.62	42.96
15.9	12.55	60.67	15.9	38.92	6.47	15.0	19.31	34.65	15.1	28.46	36.50	15.1	29.33	42.71
16.9	12.82	60.50	16.9	39.79	6.25	16.0	19.35	34.33	16.1	28.40	36.18	16.1	29.07	42.44
17.9	13.08	60.35	17.9	40.64	6.07	17.0	19.40	34.01	17.1	28.37	35.86	17.1	28.84	42.15
18.9	13.32	60.23	18.9	41.46	5.90	18.0	19.47	33.71	18.1	28.34	35.56	18.1	28.64	41.89
19.9	13.55	60.12	19.9	42.21	5.76	19.0	19.53	33.45	19.1	28.33	35.28	19.1	28.48	41.64
20.9	13.77	60.00	20.9	42.89	5.61	20.0	19.60	33.19	20.1	28.31	35.03	20.1	28.32	41.41
21.9	13.97	59.87	21.9	43.51	5.46	21.0	19.65	32.95	21.1	28.29	34.80	21.1	28.16	41.21
22.9	14.16	59.72	22.9	44.11	5.27	22.0	19.69	32.71	22.1	28.25	34.56	22.1	27.97	41.02
23.9	14.37	59.56	23.9	44.74	5.07	23.0	19.71	32.46	23.1	28.20	34.31	23.1	27.75	40.82
24.9	14.60	59.39	24.9	45.44	4.85	24.0	19.74	32.19	24.1	28.15	34.05	24.1	27.52	40.61
25.9	14.85	59.21	25.9	46.23	4.64	24.9	19.77	31.90	25.1	28.08	33.77	25.1	27.26	40.38
26.9	15.12	59.04	26.9	47.10	4.42	25.9	19.82	31.59	26.1	28.02	33.47	26.1	27.01	40.12
27.9	15.40	58.88	27.9	48.04	4.22	26.9	19.88	31.27	27.1	27.98	33.15	27.1	26.78	39.84
28.9	15.70	58.75	28.9	49.03	4.04	27.9	19.95	30.94	28.0	27.96	32.81	28.1	26.57	39.53
29.9	16.00	58.64	29.9	50.02	3.88	28.9	20.05	30.62	29.0	27.96	32.48	29.1	26.39	39.21
30.8	16.30	58.55	30.9	51.01	3.75	29.9	20.17	30.31	30.0	27.98	32.15	30.1	26.23	38.89
31.8	16.58	58.47	31.9	51.97	3.63	30.9	20.29	30.01	31.0	28.01	31.83	31.1	26.09	38.59
32.8	16.85	58.40	32.9	52.89	3.52	31.9	20.41	29.75	32.0	28.05	31.54	32.1	25.99	38.29
	13.60	+13.56		49.19	+49.18		12.27	+12.23		11.85	+11.81		20.44	+20.41
	$0^h\ 56^m$	$31^s.244$		$1^h\ 27^m$	$51^s.07$		$4^h\ 8^m$	$34^s.697$		$5^h\ 33^m$	$38^s.985$		$6^h\ 59^m$	$37^s.82$
	+85° 47′	8″.15		+88° 50′	10″.77		+85° 19′	23″.58		+85° 9′	19″.11		+87° 11′	21″.21

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

43 H. Cephei. Mag. 4.5			*α* **Ursæ Minoris.** (*Polaris.*) Mag. 2.1			**Groombridge 750.** Mag. 6.7			**Groombridge 944.** Mag. 6.4			**51 H. Cephei.** Mag. 5.3		
Mean Solar Date.	**Right Ascension.**	**Declination *North.***	**Mean Solar Date.**	**Right Ascension.**	**Declination *North.***	**Mean Solar Date.**	**Right Ascension.**	**Declination *North.***	**Mean Solar Date.**	**Right Ascension.**	**Declination *North***	**Mean Solar Date.**	**Right Ascension.**	**Declination *North.***
	h m	° ′		h m	° ′		h m	° ′		h m	° ′		h m	° ′
June	0 56	+85 46	June	1 26	+88 50	June	4 8	+85 19	June	5 33	+85 9	June	6 59	+87 11
	s	″		s	″		s	″		s	″		s	″
1.8	16.85	58.40	1.9	52.89	3.52	1.9	20.53	29.50	1.0	28.05	31.54	1.1	25.99	38.29
2.8	17.10	58.34	2.9	53.75	3.40	2.9	20.64	29.26	2.0	28.08	31.25	2.1	25.89	38.01
3.8	17.35	58.27	3.9	54.58	3.29	3.9	20.75	29.03	3.0	28.11	30.98	3.1	25.79	37.74
4.8	17.60	58.20	4.9	55.38	3.17	4.9	20.85	28.78	4.0	28.13	30.72	4.1	25.69	37.49
5.8	17.84	58.12	5.9	56.17	3.05	5.9	20.94	28.55	5.0	28.15	30.46	5.1	25.58	37.25
6.8	18.09	58.03	6.9	56.98	2.91	6.9	21.03	28.30	6.0	28.16	30.20	6.1	25.46	37.00
7.8	18.35	57.93	7.8	57.82	2.77	7.9	21.12	28.04	7.0	28.17	29.93	7.1	25.32	36.75
8.8	18.63	57.82	8.8	58.71	2.63	8.9	21.22	27.75	8.0	28.17	29.64	8.1	25.17	36.48
9.8	18.93	57.72	9.8	59.69	2.47	9.9	21.35	27.46	9.0	28.18	29.33	9.1	25.03	36.19
10.8	19.24	57.63	10.8	60.74	2.33	10.9	21.49	27.16	10.0	28.20	29.00	10.1	24.89	35.89
11.8	19.57	57.56	11.8	61.86	2.22	11.9	21.65	26.87	11.0	28.23	28.66	11.1	24.76	35.56
12.8	19.91	57.52	12.8	63.02	2.12	12.9	21.83	26.58	12.0	28.29	28.32	12.1	24.67	35.21
13.8	20.24	57.51	13.8	64.17	2.06	13.9	22.02	26.31	13.0	28.37	27.99	13.1	24.62	34.86
14.8	20.56	57.52	14.8	65.30	2.03	14.9	22.22	26.09	14.0	28.48	27.67	14.1	24.62	34.51
15.8	20.86	57.55	15.8	66.37	2.01	15.9	22.41	25.88	14.9	28.59	27.37	15.1	24.63	34.17
16.8	21.14	57.58	16.8	67.34	1.99	16.9	22.60	25.70	15.9	28.70	27.09	16.1	24.66	33.87
17.8	21.41	57.61	17.8	68.25	1.97	17.9	22.77	25.51	16.9	28.81	26.83	17.1	24.70	33.59
18.8	21.66	57.62	18.8	69.13	1.95	18.9	22.92	25.32	17.9	28.91	26.60	18.1	24.73	33.33
19.8	21.91	57.61	19.8	70.01	1.90	19.9	23.06	25.11	18.9	29.00	26.37	19.0	24.73	33.07
20.8	22.18	57.59	20.8	70.92	1.83	20.9	23.21	24.88	19.9	29.06	26.13	20.0	24.71	32.81
21.8	22.47	57.57	21.8	71.90	1.74	21.9	23.37	24.63	20.9	29.13	25.87	21.0	24.66	32.54
22.8	22.78	57.55	22.8	72.96	1.66	22.9	23.55	24.38	21.9	29.20	25.58	22.0	24.61	32.24
23.8	23.11	57.54	23.8	74.09	1.59	23.9	23.74	24.11	22.9	29.28	25.27	23.0	24.57	31.91
24.8	23.44	57.54	24.8	75.27	1.55	24.9	23.94	23.86	23.9	29.36	24.95	24.0	24.55	31.56
25.8	23.78	57.56	25.8	76.48	1.52	25.9	24.16	23.62	24.9	29.47	24.62	25.0	24.57	31.20
26.8	24.12	57.61	26.8	77.69	1.52	26.9	24.40	23.40	25.9	29.60	24.30	26.0	24.60	30.84
27.8	24.45	57.68	27.8	78.85	1.54	27.9	24.64	23.19	26.9	29.75	23.99	27.0	24.67	30.49
28.8	24.77	57.76	28.8	79.97	1.56	28.9	24.87	23.01	27.9	29.91	23.69	28.0	24.75	30.15
29.8	25.07	57.85	29.8	81.03	1.60	29.9	25.11	22.84	28.9	30.07	23.42	29.0	24.86	29.83
30.8	25.36	57.93	30.8	82.04	1.63	30.9	25.33	22.69	29.9	30.23	23.17	30.0	24.97	29.52
31.8	25.64	58.01	31.8	83.01	1.67	31.9	25.54	22.53	30.9	30.39	22.94	31.0	25.08	29.23
	13.60	+13.56		49.13	+49.12		12.27	+12.23		11.85	+11.80		20.42	+20.40
$0^h\ 56^m\ 31^s.244$			$1^h\ 27^m\ 51^s.07$			$4^h\ 8^m\ 34^s.697$			$5^h\ 33^m\ 38^s.985$			$6^h\ 59^m\ 37^s.82$		
+85° 47′ 8″.15			+88° 50′ 10″.77			+85° 19′ 23″.58			+85° 9′ 19″.11			+87° 11′ 21″.21		

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

43 H. Cephei. Mag. 4.5			**α Ursæ Minoris.** (*Polaris.*) Mag. 2.1			**Groombridge 750.** Mag. 6.7			**Groombridge 944.** Mag. 6.4			**51 H. Cephei.** Mag. 5.3		
Mean Solar Date.	Right Ascension.	Declination *North.*	Mean Solar Date.	Right Ascension.	Declination *North.*	Mean Solar Date.	Right Ascension.	Declination *North.*	Mean Solar Date.	Right Ascension.	Declination *North.*	Mean Solar Date.	Right Ascension.	Declination *North.*
	h m	° ′		h m	° ′		h m	° ′		h m	° ′		h m	° ′
July	0 56	+85 46	July	1 27	+88 50	July	4 8	+85 19	July	5 33	+85 9	July	6 59	+87 11
	s	″		s	″		s	″		s	″		s	″
1.8	25.64	58.01	1.8	23.01	1.67	1.9	25.54	22.53	1.9	30.53	22.71	1.0	25.08	29.23
2.8	25.90	58.08	2.8	23.95	1.69	2.9	25.74	22.37	2.9	30.66	22.48	2.0	25.17	28.95
3.8	26.16	58.14	3.8	24.90	1.71	3.9	25.94	22.21	3.9	30.79	22.24	3.0	25.26	28.68
4.8	26.43	58.19	4.8	25.88	1.71	4.9	26.14	22.04	4.9	30.91	22.00	4.0	25.34	28.40
5.7	26.71	58.24	5.8	26.89	1.71	5.9	26.34	21.86	5.9	31.02	21.74	5.0	25.39	28.12
6.7	27.01	58.29	6.8	27.96	1.71	6.9	26.55	21.65	6.9	31.14	21.46	6.0	25.44	27.82
7.7	27.33	58.35	7.8	29.10	1.72	7.9	26.78	21.43	7.9	31.28	21.17	6.9	25.50	27.49
8.7	27.67	58.43	8.8	30.30	1.74	8.9	27.03	21.22	8.9	31.45	20.87	7.9	25.59	27.16
9.7	28.01	58.53	9.8	31.54	1.78	9.9	27.30	21.03	9.9	31.64	20.57	8.9	25.69	26.80
10.7	28.36	58.66	10.8	32.80	1.85	10.9	27.59	20.85	10.9	31.84	20.28	9.9	25.83	26.44
11.7	28.69	58.81	11.8	34.02	1.95	11.9	27.88	20.70	11.9	32.06	20.02	10.9	26.00	26.07
12.7	29.01	58.98	12.8	35.20	2.07	12.9	28.16	20.57	12.9	32.30	19.78	11.9	26.22	25.74
13.7	29.30	59.17	13.8	36.29	2.20	13.9	28.45	20.48	13.9	32.53	19.58	12.9	26.47	25.41
14.7	29.57	59.36	14.7	37.29	2.33	14.9	28.72	20.41	14.9	32.74	19.39	13.9	26.71	25.11
15.7	29.82	59.53	15.7	38.24	2.46	15.9	28.97	20.33	15.9	32.93	19.21	14.9	26.94	24.85
16.7	30.06	59.68	16.7	39.16	2.57	16.9	29.21	20.24	16.9	33.12	19.03	15.9	27.16	24.60
17.7	30.31	59.81	17.7	40.09	2.66	17.9	29.44	20.11	17.9	33.30	18.83	16.9	27.35	24.34
18.7	30.58	59.92	18.7	41.10	2.74	18.8	29.68	19.98	18.9	33.48	18.61	17.9	27.52	24.08
19.7	30.87	60.04	19.7	42.16	2.80	19.8	29.92	19.83	19.9	33.65	18.37	18.9	27.68	23.79
20.7	31.18	60.17	20.7	43.29	2.87	20.8	30.18	19.68	20.9	33.84	18.11	19.9	27.84	23.48
21.7	31.51	60.32	21.7	44.47	2.96	21.8	30.47	19.52	21.9	34.05	17.84	20.9	28.01	23.15
22.7	31.84	60.48	22.7	45.69	3.07	22.8	30.78	19.38	22.9	34.28	17.58	21.9	28.20	22.81
23.7	32.16	60.66	23.7	46.90	3.21	23.8	31.08	19.25	23.9	34.52	17.35	22.9	28.42	22.46
24.7	32.47	60.87	24.7	48.08	3.37	24.8	31.39	19.15	24.9	34.77	17.12	23.9	28.68	22.13
25.7	32.76	61.10	25.7	49.20	3.55	25.8	31.70	19.07	25.9	35.03	16.91	24.9	28.96	21.80
26.7	33.04	61.33	26.7	50.26	3.73	26.8	32.00	19.02	26.9	35.29	16.72	25.9	29.25	21.48
27.7	33.30	61.55	27.7	51.27	3.91	27.8	32.30	18.98	27.9	35.53	16.55	26.9	29.55	21.20
28.7	33.54	61.77	28.7	52.22	4.09	28.8	32.58	18.95	28.9	35.77	16.40	27.9	29.85	20.93
29.7	33.77	61.98	29.7	53.12	4.26	29.8	32.85	18.91	29.9	36.00	16.25	28.9	30.16	20.67
30.7	34.00	62.19	30.7	54.03	4.44	30.8	33.12	18.86	30.9	36.22	16.10	29.9	30.45	20.42
31.7	34.24	62.39	31.7	54.94	4.59	31.8	33.38	18.81	31.9	36.45	15.94	30.9	30.73	20.19
32.7	34.49	62.57	32.7	55.87	4.74	32.8	33.64	18.74	32.9	36.67	15.77	31.9	30.97	19.95
	13.60	+13.56		49.14	+49.13		12.26	+12.22		11.84	+11.80		20.40	+20.38
	$0^h\ 56^m$	$31^s.244$		$1^h\ 27^m$	$51^s.07$		$4^h\ 8^m$	$34^s.697$		$5^h\ 33^m$	$38^s.985$		$6^h\ 59^m$	$37^s.82$
	+85° 47′	8″.15		+88° 50′	10″.77		+85° 19′	23″.58		+85° 9′	19″.11		+87° 11′	21″.21

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

43 H. Cephei. Mag. 4.5			*α* **Ursæ Minoris.** (*Polaris.*) Mag. 2.1			**Groombridge 750.** Mag. 6.7			**Groombridge 944.** Mag. 6.4			**51 H. Cephei.** Mag. 5.3		
Mean Solar Date.	**Right Ascension.**	**Declination *North.***	**Mean Solar Date.**	**Right Ascension.**	**Declination *North.***	**Mean Solar Date.**	**Right Ascension.**	**Declination *North.***	**Mean Solar Date.**	**Right Ascension.**	**Declination *North.***	**Mean Solar Date.**	**Right Ascension.**	**Declination *North.***
	h m	° ′		h m	° ′		h m	° ′		h m	° ′		h m	° ′
Aug.	0 56	+85 47	Aug.	1 27	+88 50	Aug.	4 8	+85 19	Aug.	5 33	+85 9	Aug.	6 59	+87 11
	s	″		s	″		s	″		s	″		s	″
1.7	34.49	2.57	1.7	55.87	4.74	1.8	33.64	18.74	1.9	36.67	15.77	1.9	31.21	19.69
2.7	34.75	2.75	2.7	56.84	4.88	2.8	33.91	18.67	2.9	36.88	15.59	2.9	31.45	19.41
3.7	35.02	2.94	3.7	57.87	5.02	3.8	34.20	18.58	3.9	37.10	15.39	3.9	31.71	19.11
4.7	35.31	3.14	4.7	58.97	5.18	4.8	34.50	18.49	4.9	37.34	15.17	4.9	31.99	18.80
5.7	35.61	3.36	5.7	60.11	5.36	5.8	34.81	18.40	5.9	37.60	14.95	5.9	32.30	18.48
6.7	35.92	3.61	6.7	61.27	5.55	6.8	35.14	18.34	6.9	37.89	14.75	6.9	32.64	18.17
7.7	36.21	3.89	7.7	62.42	5.77	7.8	35.49	18.31	7.9	38.19	14.56	7.9	33.01	17.86
8.7	36.48	4.19	8.7	63.51	6.03	8.8	35.82	18.30	8.9	38.49	14.40	8.9	33.42	17.58
9.7	36.73	4.50	9.7	64.53	6.30	9.8	36.16	18.31	9.8	38.80	14.28	9.9	33.85	17.33
10.7	36.96	4.82	10.7	65.46	6.58	10.8	36.49	18.35	10.8	39.10	14.18	10.9	34.28	17.11
11.6	37.16	5.12	11.7	66.28	6.83	11.8	36.80	18.39	11.8	39.38	14.09	11.9	34.68	16.89
12.6	37.36	5.40	12.7	67.07	7.08	12.8	37.09	18.42	12.8	39.66	14.01	12.9	35.05	16.67
13.6	37.56	5.66	13.7	67.88	7.30	13.8	37.37	18.46	13.8	39.92	13.91	13.9	35.41	16.47
14.6	37.77	5.91	14.7	68.70	7.52	14.8	37.64	18.47	14.8	40.16	13.79	14.9	35.74	16.25
15.6	37.99	6.15	15.7	69.58	7.73	15.8	37.93	18.46	15.8	40.41	13.66	15.9	36.05	16.02
16.6	38.23	6.40	16.7	70.55	7.92	16.8	38.23	18.43	16.8	40.66	13.51	16.9	36.38	15.76
17.6	38.49	6.66	17.7	71.56	8.14	17.8	38.54	18.40	17.8	40.93	13.36	17.9	36.74	15.47
18.6	38.76	6.94	18.7	72.60	8.36	18.8	38.86	18.39	18.8	41.22	13.20	18.9	37.13	15.19
19.6	39.02	7.24	19.6	73.65	8.62	19.8	39.20	18.38	19.8	41.52	13.05	19.9	37.54	14.91
20.6	39.27	7.55	20.6	74.67	8.89	20.8	39.55	18.41	20.8	41.84	12.91	20.9	37.97	14.65
21.6	39.50	7.88	21.6	75.64	9.19	21.8	39.89	18.45	21.8	42.16	12.80	21.9	38.42	14.41
22.6	39.71	8.22	22.6	76.53	9.49	22.8	40.22	18.51	22.8	42.47	12.72	22.9	38.88	14.18
23.6	39.91	8.56	23.6	77.36	9.80	23.7	40.54	18.59	23.8	42.79	12.66	23.9	39.33	13.99
24.6	40.09	8.90	24.6	78.12	10.10	24.7	40.85	18.68	24.8	43.10	12.61	24.9	39.78	13.80
25.6	40.26	9.23	25.6	78.86	10.40	25.7	41.16	18.77	25.8	43.40	12.57	25.9	40.22	13.62
26.6	40.42	9.55	26.6	79.55	10.69	26.7	41.45	18.85	26.8	43.68	12.53	26.9	40.64	13.45
27.6	40.58	9.85	27.6	80.23	10.97	27.7	41.73	18.94	27.8	43.95	12.50	27.9	41.05	13.30
28.6	40.74	10.15	28.6	80.93	11.23	28.7	42.01	19.01	28.8	44.22	12.45	28.9	41.45	13.13
29.6	40.91	10.44	29.6	81.67	11.48	29.7	42.29	19.07	29.8	44.48	12.38	29.9	41.84	12.94
30.6	41.10	10.73	30.6	82.45	11.74	30.7	42.58	19.11	30.8	44.75	12.29	30.8	42.24	12.72
31.6	41.30	11.03	31.6	83.30	12.00	31.7	42.89	19.14	31.8	45.04	12.20	31.8	42.64	12.50
32.6	41.51	11.34	32.6	84.19	12.28	32.7	43.21	19.19	32.8	45.35	12.11	32.8	43.07	12.27
	13.61	+13.57		49.20	+49.19		12.26	+12.22		11.84	+11.79		20.38	+20.36
	$0^h\ 56^m$	$31^s.244$		$1^h\ 27^m$	$51^s.07$		$4^h\ 8^m$	$34^s.697$		$5^h\ 33^m$	$38^s.985$		$6^h\ 59^m$	$37^s.82$
	+85° 47′	8″.15		+88° 50′	10″.77		+85° 19′	23″.58		+85° 9′	19″.11		+87° 11′	21″.21

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

43 H. Cephei. Mag. 4.5			**α Ursæ Minoris.** (*Polaris.*) Mag. 2.1			**Groombridge 750.** Mag. 6.7			**Groombridge 944.** Mag. 6.4			**51 H. Cephei.** Mag. 5.3		
Mean Solar Date.	Right Ascension.	Declination *North.*	Mean Solar Date.	Right Ascension.	Declination *North.*	Mean Solar Date.	Right Ascension.	Declination *North.*	Mean Solar Date.	Right Ascension.	Declination *North.*	Mean Solar Date.	Right Ascension.	Declination *North.*
	h m	° ′		h m	° ′		h m	° ′		h m	° ′		h m	° ′
Sept.	0 56	+85 47	Sept.	1 28	+88 50	Sept.	4 8	+85 19	Sept.	5 33	+85 9	Sept.	6 59	+87 11
	s	″		s	″		s	″		s	″		s	″
1.6	41.51	11.34	1.6	24.19	12.28	1.7	43.21	19.19	1.8	45.35	12.11	1.8	43.07	12.27
2.6	41.73	11.67	2.6	25.10	12.58	2.7	43.54	19.25	2.8	45.67	12.01	2.8	43.53	12.04
3.6	41.94	12.03	3.6	26.01	12.90	3.7	43.88	19.32	3.8	46.00	11.93	3.8	44.03	11.82
4.6	42.14	12.41	4.6	26.85	13.24	4.7	44.23	19.42	4.8	46.35	11.87	4.8	44.56	11.62
5.6	42.31	12.81	5.6	27.61	13.62	5.7	44.58	19.56	5.8	46.70	11.85	5.8	45.10	11.44
6.6	42.45	13.21	6.6	28.30	13.99	6.7	44.91	19.72	6.8	47.05	11.85	6.8	45.64	11.28
7.6	42.57	13.60	7.6	28.91	14.36	7.7	45.22	19.89	7.8	47.38	11.88	7.8	46.18	11.17
8.6	42.68	13.98	8.6	29.45	14.71	8.7	45.50	20.06	8.8	47.69	11.92	8.8	46.68	11.07
9.6	42.78	14.34	9.6	29.95	15.05	9.7	45.78	20.22	9.8	47.98	11.95	9.8	47.16	10.96
10.6	42.89	14.68	10.6	30.47	15.35	10.7	46.07	20.36	10.8	48.26	11.97	10.8	47.61	10.83
11.6	43.01	15.00	11.6	31.04	15.66	11.7	46.34	20.49	11.8	48.53	11.96	11.8	48.06	10.70
12.6	43.15	15.32	12.6	31.68	15.96	12.7	46.62	20.60	12.8	48.81	11.93	12.8	48.50	10.55
13.6	43.31	15.65	13.6	32.37	16.26	13.7	46.92	20.69	13.8	49.12	11.89	13.8	48.95	10.38
14.6	43.48	16.00	14.6	33.09	16.57	14.7	47.24	20.79	14.7	49.44	11.86	14.8	49.44	10.19
15.6	43.66	16.36	15.6	33.84	16.91	15.7	47.57	20.91	15.7	49.77	11.83	15.8	49.94	10.02
16.5	43.82	16.74	16.6	34.58	17.28	16.7	47.90	21.05	16.7	50.11	11.81	16.8	50.47	9.85
17.5	43.96	17.14	17.6	35.25	17.65	17.7	48.22	21.20	17.7	50.46	11.81	17.8	51.01	9.69
18.5	44.08	17.54	18.6	35.85	18.04	18.7	48.55	21.38	18.7	50.81	11.83	18.8	51.57	9.57
19.5	44.18	17.95	19.6	36.38	18.43	19.7	48.85	21.57	19.7	51.15	11.88	19.8	52.13	9.47
20.5	44.26	18.35	20.6	36.85	18.83	20.7	49.14	21.78	20.7	51.47	11.95	20.8	52.68	9.38
21.5	44.33	18.75	21.6	37.25	19.21	21.7	49.42	22.00	21.7	51.78	12.03	21.8	53.21	9.32
22.5	44.39	19.14	22.6	37.61	19.58	22.7	49.69	22.21	22.7	52.08	12.11	22.8	53.73	9.26
23.5	44.44	19.51	23.6	37.96	19.93	23.7	49.95	22.42	23.7	52.37	12.19	23.8	54.23	9.20
24.5	44.50	19.86	24.6	38.32	20.28	24.7	50.20	22.62	24.7	52.65	12.26	24.8	54.72	9.14
25.5	44.56	20.20	25.5	38.69	20.62	25.7	50.46	22.80	25.7	52.92	12.33	25.8	55.19	9.06
26.5	44.63	20.53	26.5	39.09	20.94	26.7	50.72	22.95	26.7	53.20	12.38	26.8	55.65	8.98
27.5	44.72	20.87	27.5	39.55	21.27	27.7	50.99	23.10	27.7	53.50	12.41	27.8	56.13	8.88
28.5	44.82	21.22	28.5	40.06	21.61	28.7	51.28	23.27	28.7	53.80	12.43	28.8	56.62	8.78
29.5	44.93	21.59	29.5	40.61	21.97	29.6	51.58	23.45	29.7	54.11	12.46	29.8	57.15	8.66
30.5	45.04	21.99	30.5	41.15	22.34	30.6	51.88	23.64	30.7	54.44	12.50	30.8	57.70	8.55
31.5	45.13	22.41	31.5	41.66	22.74	31.6	52.18	23.85	31.7	54.78	12.57	31.8	58.28	8.44
13.62 +13.58			49.32 +49.31			12.26 +12.22			11.84 +11.79			20.37 +20.35		
$0^h\ 56^m\ 31^s.244$			$1^h\ 27^m\ 51^s.07$			$4^h\ 8^m\ 34^s.697$			$5^h\ 33^m\ 38^s.985$			$6^h\ 59^m\ 37^s.82$		
+85° 47′ 8″.15			+88° 50′ 10″.77			+85° 19′ 23″.58			+85° 9′ 19″.11			+87° 11′ 21″.21		

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

43 H. Cephei. Mag. 4.5			**α Ursæ Minoris.** (*Polaris.*) Mag. 2.1			**Groombridge 750.** Mag. 6.7			**Groombridge 944.** Mag. 6.4			**51 H. Ce** Mag.	
Mean Solar Date.	**Right Ascension.**	**Declination *North.***	**Mean Solar Date.**	**Right Ascension.**	**Declination *North.***	**Mean Solar Date.**	**Right Ascension.**	**Declination *North.***	**Mean Solar Date.**	**Right Ascension.**	**Declination *North.***	**Mean Solar Date.**	**Right Ascension.**
	h m	° ′		h m	° ′		h m	° ′		h m	° ′		h m
Oct.	0 56	+85 47	Oct.	1 28	+88 50	Oct.	4 8	+85 19	Oct.	5 33	+85 9	Oct.	6 59
	s	″		s	″		s	″		s	″		s
1.5	45.13	22.41	1.5	41.66	22.74	1.6	52.18	23.85	1.7	54.78	12.57	1.8	58.28
2.5	45.20	22.84	2.5	42.09	23.16	2.6	52.49	24.09	2.7	55.13	12.66	2.8	58.89
3.5	45.25	23.28	3.5	42.43	23.60	3.6	52.79	24.35	3.7	55.48	12.79	3.8	59.50
4.5	45.27	23.72	4.5	42 68	24.03	4.6	53.07	24.63	4.7	55.80	12.94	4.8	60.09
5.5	45.27	24.14	5.5	42.84	24.45	5.6	53.33	24.93	5.7	56.11	13.09	5.8	60.66
6.5	45.26	24.54	6.5	42.96	24.84	6.6	53.56	25.20	6.7	56.40	13.25	6.7	61.20
7.5	45.25	24.91	7.5	43.07	25.21	7.6	53.78	25.46	7.7	56.68	13.39	7.7	61.71
8.5	45.25	25.26	8.5	43.22	25.56	8.6	54.00	25.70	8.7	56.94	13.52	8.7	62.20
9.5	45.26	25.61	9.5	43.43	25.91	9.6	54.23	25.92	9.7	57.21	13.63	9.7	62.68
10.5	45.29	25.96	10.5	43.72	26.25	10.6	54.47	26.12	10.7	57.49	13.72	10.7	63.17
11.5	45.34	26.33	11.5	44.05	26.61	11.6	54.72	26.34	11.7	57.78	13.80	11.7	63.68
12.5	45.40	26.71	12.5	44.39	26.97	12.6	54.99	26.56	12.7	58.09	13.89	12.7	64.22
13.5	45.45	27.10	13.5	44.70	27.37	13.6	55.27	26.79	13.7	58.41	13.99	13.7	64.77
14.5	45.48	27.51	14.5	44.98	27.78	14.6	55.54	27.05	14.7	58.73	14.11	14.7	65.34
15.5	45.49	27.93	15.5	45.19	28.20	15.6	55.81	27.33	15.7	59.05	14.25	15.7	65.93
16.5	45.48	28.36	16.5	45.33	28.64	16.6	56.06	27.63	16.7	59.37	14.42	16.7	66.51
17.5	45.45	28.78	17.5	45.40	29.05	17.6	56.30	27.93	17.7	59.67	14.61	17.7	67.08
18.5	45.40	29.18	18.5	45.41	29.45	18.6	56.53	28.25	18.7	59.96	14.81	18.7	67.64
19.5	45.34	29.56	19.5	45.36	29.85	19.6	56.73	28.56	19.7	60.24	15.01	19.7	68.19
20.5	45.27	29.92	20.5	45.27	30.24	20.6	56.92	28.86	20.7	60.50	15.21	20.7	68.72
21.5	45.20	30.27	21.5	45.18	30.62	21.6	57.11	29.16	21.6	60.75	15.41	21.7	69.21
22.5	45.13	30.61	22.5	45.10	30.97	22.6	57.29	29.44	22.6	61.00	15.60	22.7	69.68
23.4	45.08	30.95	23.5	45.04	31.32	23.6	57.48	29.71	23.6	61.25	15.77	23.7	70.16
24.4	45.05	31.30	24.5	45.04	31.66	24.6	57.67	29.96	24.6	61.50	15.93	24.7	70.64
25.4	45.04	31.66	25.5	45.09	32.01	25.6	57.87	30.21	25.6	61.76	16.07	25.7	71.13
26.4	45.03	32.02	26.5	45.18	32.38	26.6	58.08	30.47	26.6	62.03	16.21	26.7	71.64
27.4	45.01	32.39	27.5	45.27	32.75	27.6	58.31	30.74	27.6	62.31	16.37	27.7	72.17
28.4	44.98	32.78	28.5	45.33	33.16	28.6	58.54	31.03	28.6	62.60	16.55	28.7	72.72
29.4	44.94	33.20	29.5	45.35	33.57	29.6	58.76	31.34	29.6	62.90	16.75	29.7	73.30
30.4	44.88	33.62	30.5	45.29	34.00	30.6	58.97	31.69	30.6	63.20	16.97	30.7	73.90
31.4	44.79	34.03	31.5	45.12	34.43	31.6	59.18	32.06	31.6	63.49	17.22	31.7	74.48
32.4	44.67	34.43	32.4	44.84	34.86	32.6	59.36	32.43	32.6	63.75	17.49	32.7	75.03
	13.62	+13.59		49.44	+49.44		12.27	+12.23		11.84	+11.80		20.37
	$0^h\ 56^m$	$31^s.244$		$1^h\ 27^m$	$51^s.07$		$4^h\ 8^m$	$34^s.697$		$5^h\ 33^m$	$38^s.985$		$6^h\ 59^m$
	+85° 47′	8″.15		+88° 50′	10″.77		+85° 19′	23″.58		+85° 9′	19″.11		+87° 11′

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

43 H. Cephei. Mag. 4.5			*α* **Ursæ Minoris.** (*Polaris.*) Mag. 2.1			**Groombridge 750.** Mag. 6.7			**Groombridge 944.** Mag. 6.4			**51 H. Cephei.** Mag. 5.3		
Mean Solar Date.	**Right Ascension.**	**Declination *North.***	**Mean Solar Date.**	**Right Ascension.**	**Declination *North.***	**Mean Solar Date.**	**Right Ascension.**	**Declination *North.***	**Mean Solar Date.**	**Right Ascension.**	**Declination *North.***	**Mean Solar Date.**	**Right Ascension.**	**Declination *North.***
	h m	° ′		h m	° ′		h m	° ′		h m	° ′		h m	° ′
Nov.	0 56	+85 47	Nov.	1 28	+88 50	Nov.	4 8	+85 19	Nov.	5 34	+85 9	Nov.	7 0	+87 11
	s	″		s	″		s	″		s	″		s	″
1.4	44.67	34.43	1.4	44.84	34.86	1.6	59.36	32.43	1.6	3.75	17.49	1.7	15.03	9.02
2.4	44.54	34.81	2.4	44.52	35.25	2.6	59.51	32.80	2.6	4.00	17.76	2.7	15.55	9.17
3.4	44.40	35.16	3.4	44.18	35.64	3.6	59.66	33.15	3.6	4.23	18.02	3.7	16.04	9.33
4.4	44.27	35.49	4.4	43.86	35.99	4.5	59.79	33.47	4.6	4.44	18.27	4.7	16.51	9.47
5.4	44.15	35.80	5.4	43.57	36.34	5.5	59.92	33.77	5.6	4.65	18.50	5.7	16.96	9.59
6.4	44.05	36.11	6.4	43.34	36.66	6.5	60.06	34.06	6.6	4.86	18.70	6.7	17.40	9.69
7.4	43.97	36.43	7.4	43.18	36.98	7.5	60.21	34.33	7.6	5.09	18.89	7.7	17.85	9.78
8.4	43.91	36.76	8.4	43.05	37.33	8.5	60.37	34.63	8.6	5.32	19.08	8.7	18.34	9.87
9.4	43.84	37.11	9.4	42.92	37.70	9.5	60.55	34.94	9.6	5.56	19.29	9.7	18.84	9.95
10.4	43.75	37.46	10.4	42.76	38.08	10.5	60.72	35.25	10.6	5.81	19.51	10.7	19.34	10.04
11.4	43.64	37.83	11.4	42.53	38.47	11.5	60.89	35.58	11.6	6.07	19.75	11.6	19.86	10.16
12.4	43.51	38.21	12.4	42.23	38.85	12.5	61.05	35.93	12.6	6.32	20.02	12.6	20.39	10.30
13.4	43.37	38.58	13.4	41.85	39.25	13.5	61.19	36.30	13.6	6.56	20.30	13.6	20.91	10.46
14.4	43.21	38.93	14.4	41.41	39.64	14.5	61.32	36.69	14.6	6.79	20.60	14.6	21.41	10.64
15.4	43.03	39.27	15.4	40.91	40.01	15.5	61.43	37.06	15.6	7.00	20.90	15.6	21.89	10.84
16.4	42 84	39.59	16.4	40.37	40.36	16.5	61.53	37.42	16.6	7.19	21.21	16.6	22.35	11.05
17.4	42.65	39.89	17.4	39.81	40.70	17.5	61 61	37.78	17.6	7.37	21.51	17.6	22.78	11.25
18.4	42.47	40.17	18.4	39.26	41.02	18.5	61.68	38 12	18.6	7.54	21.80	18.6	23.19	11.44
19.4	42.30	40.44	19.4	38.74	41.31	19.5	61.74	38.46	19.6	7.70	22.08	19.6	23.58	11.64
20.4	42.15	40.71	20.4	38.26	41.61	20.5	61.82	38.78	20.6	7.86	22.34	20.6	23.96	11.81
21.4	42.01	40.97	21.4	37.83	41.91	21.5	61.90	39.07	21.6	8.02	22.58	21.6	24.35	11.98
22.4	41.87	41.24	22.4	37.43	42.21	22.5	62.00	39.37	22.6	8.19	22.82	22.6	24.75	12.13
23.4	41.74	41.53	23.4	37.05	42.53	23.5	62.10	39.68	23 6	8.38	23.07	23.6	25.17	12.27
24.4	41.60	41.84	24.4	36.67	42.85	24.5	62.22	40.00	24.6	8.58	23.32	24.6	25.63	12.41
25.4	41.45	42.16	25.4	36.26	43.20	25.5	62.34	40.35	25.6	8.79	23.59	25.6	26.10	12.59
26.4	41.27	42.49	26.4	35.76	43.56	26.5	62.44	40.72	26.6	9.00	23.89	26.6	26.58	12.79
27.4	41.07	42.82	27.4	35.17	43.93	27.5	62.53	41.11	27.5	9.19	24.22	27.6	27.05	13.02
28.4	40.85	43.14	28.4	34.49	44.28	28.5	62.60	41.51	28.5	9.37	24.57	28.6	27.50	13.27
29.3	40.61	43.43	29.4	33.73	44.62	29.5	62.65	41.90	29.5	9.53	24.93	29.6	27.93	13.54
30.3	40.36	43.68	30.4	32.92	44.93	30.5	62.67	42.30	30.5	9.66	25.28	30.6	28.32	13.81
31.3	40.11	43.90	31.4	32.12	45.21	31.5	62.67	42.65	31.5	9.77	25.62	31.6	28.67	14.08
	13.63	+13.60		49.59	+49.58		12.28	+12.23		11.84	+11.80		20.37	+20.35
	$0^h\ 56^m\ 31^s.244$			$1^h\ 27^m\ 51^s.07$			$4^h\ 8^m\ 34^s.697$			$5^h\ 33^m\ 38^s.985$			$6^h\ 59^m\ 37^s.82$	
		+85° 47′ 8″.15			+88° 50′ 10″.77			+85° 19′ 23″.58			+85° 9′ 19″.11			+87° 11′ 21″.21

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

43 H. Cephei. Mag. 4.5			***α* Ursæ Minoris.** (*Polaris.*) Mag. 2.1			**Groombridge 750.** Mag. 6.7			**Groombridge 944.** Mag. 6.4			**51 H. Cephei.** Mag. 5.3		
Mean Solar Date.	**Right Ascension.**	**Declination *North*.**	**Mean Solar Date.**	**Right Ascension.**	**Declination *North*.**	**Mean Solar Date.**	**Right Ascension.**	**Declination *North*.**	**Mean Solar Date.**	**Right Ascension.**	**Declination *North*.**	**Mean Solar Date.**	**Right Ascension.**	**Declination *North*.**
	h m	° ′		h m	° ′		h m	° ′		h m	° ′		h m	° ′
Dec.	0 56	+85 47	Dec.	1 28	+88 50	Dec.	4 9	+85 19	Dec.	5 34	+85 9	Dec.	7 0	+87 11
	s	″		s	″		s	″		s	″		s	″
1.3	40.11	43.90	1.4	32.12	45.21	1.5	2.67	42.65	1.5	9.77	25.62	1.6	28.67	14.08
2.3	39.88	44.10	2.4	31.37	45.47	2.5	2.68	42.99	2.5	9.88	25.93	2.6	28.99	14.34
3.3	39.67	44.30	3.4	30.67	45.72	3.5	2.70	43.30	3.5	9.99	26.22	3.6	29.31	14.57
4.3	39.47	44.53	4.4	30.05	45.96	4.5	2.72	43.60	4.5	10.10	26.49	4.6	29.61	14.78
5.3	39.28	44.77	5.4	29.47	46.21	5.5	2.75	43.91	5.5	10.22	26.75	5.6	29.94	14.98
6.3	39.11	45.01	6.4	28.90	46.47	6.5	2.81	44.22	6.5	10.35	27.02	6.6	30.30	15.18
7.3	38.93	45.26	7.3	28.32	46.74	7.5	2.86	44.54	7.5	10.49	27.31	7.6	30.67	15.38
8.3	38.73	45.51	8.3	27.68	47.04	8.5	2.89	44.77	8.5	10.63	27.61	8.6	31.04	15.60
9.3	38.51	45.76	9.3	26.98	47.34	9.5	2.92	45.22	9.5	10.77	27.93	9.6	31.42	15.85
10.3	38.27	46.02	10.3	26.20	47.63	10.5	2.93	45.59	10.5	10.90	28.27	10.6	31.79	16.12
11.3	38.01	46.27	11.3	25.35	47.91	11.4	2.93	45.97	11.5	11.01	28.63	11.6	32.14	16.41
12.3	37.74	46.49	12.3	24.45	48.19	12.4	2.91	46.36	12.5	11.10	28.99	12.6	32.47	16.71
13.3	37.46	46.69	13.3	23.51	48.43	13.4	2.88	46.72	13.5	11.17	29.35	13.6	32.77	17.02
14.3	37.17	46.87	14.3	22.55	48.69	14.4	2.82	47.07	14.5	11.23	29.71	14.6	33.04	17.33
15.3	36.88	47.03	15.3	21.58	48.90	15.4	2.76	47.42	15.5	11.28	30.05	15.6	33.29	17.65
16.3	36.61	47.18	16.3	20.64	49.10	16.4	2.70	47.74	16.5	11.32	30.38	16.6	33.51	17.95
17.3	36.35	47.32	17.3	19.73	49.27	17.4	2.64	48.04	17.5	11.35	30.69	17.6	33.71	18.23
18.3	36.11	47.44	18.3	18.88	49.45	18.4	2.58	48.32	18.5	11.39	30.99	18.5	33.92	18.49
19.3	35.88	47.57	19.3	18.09	49.63	19.4	2.54	48.60	19.5	11.44	31.27	19.5	34.13	18.74
20.3	35.66	47.72	20.3	17.33	49.81	20.4	2.51	48.89	20.5	11.50	31.55	20.5	34.36	18.99
21.3	35.45	47.88	21.3	16.58	49.99	21.4	2.48	49.18	21.5	11.56	31.84	21.5	34.62	19.23
22.3	35.23	48.05	22.3	15.81	50.21	22.4	2.46	49.48	22.5	11.63	32.14	22.5	34.90	19.49
23.3	34.99	48.23	23.3	14.99	50.44	23.4	2.45	49.81	23.5	11.71	32.47	23.5	35.18	19.77
24.3	34.72	48.41	24.3	14.08	50.67	24.4	2.40	50.16	24.5	11.78	32.82	24.5	35.47	20.07
25.3	34.43	48.59	25.3	13.08	50.90	25.4	2.34	50.53	25.5	11.84	33.19	25.5	35.74	20.41
26.3	34.12	48.75	26.3	12.00	51.10	26.4	2.26	50.89	26.5	11.87	33.58	26.5	35.97	20.75
27.3	33.80	48.88	27.3	10.87	51.30	27.4	2.16	51.24	27.5	11.88	33.96	27.5	36.17	21.12
28.3	33.48	48.98	28.3	9.75	51.46	28.4	2.03	51.56	28.5	11.87	34.33	28.5	36.33	21.48
29.3	33.17	49.05	29.3	8.66	51.59	29.4	1.90	51.86	29.5	11.85	34.67	29.5	36.47	21.81
30.3	32.88	49.10	30.3	7.62	51.70	30.4	1.77	52.13	30.5	11.82	34.98	30.5	36.57	22.13
31.3	32.61	49.14	31.3	6.65	51.79	31.4	1.65	52.38	31.5	11.78	35.27	31.5	36.66	22.42
32.3	32.36	49.19	32.3	5.75	51.88	32.4	1.55	52.62	32.5	11.75	35.54	32.5	36.76	22.69
	13.64	+13.60		49.69	+49.68		12.28	+12.24		11.85	+11.80		20.39	+20.36
	$0^h\ 56^m\ 31^s.244$			$1^h\ 27^m\ 51^s.07$			$4^h\ 8^m\ 34^s.697$			$5^h\ 33^m\ 38^s.985$			$6^h\ 59^m\ 37^s.82$	
	+85° 47′ 8″.15			+88° 50′ 10″.77			+85° 19′ 23″.58			+85° 9′ 19″.11			+87° 11′ 21″.21	

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

Groombridge 1119. Mag. 7.0			**1 H. Draconis.** Mag. 4.6			**30 H. Camelop.** Mag. 5.3			**Bradley 1672.** Mag. 6.3			**Groombridge 2283.** Mag. 7.2		
Mean Solar Date.	**Right Ascension.**	**Declination *North*.**	**Mean Solar Date.**	**Right Ascension.**	**Declination *North*.**	**Mean Solar Date.**	**Right Ascension.**	**Declination *North*.**	**Mean Solar Date.**	**Right Ascension.**	**Declination *North*.**	**Mean Solar Date.**	**Right Ascension.**	**Declination *North*.**
	h m	° ′		h m	° ′		h m	° ′		h m	° ′		h m	° ′
Jan.	8 11	+88 53	Jan.	9 24	+81 42	Jan.	10 20	+83 0	Jan.	12 14	+88 10	Jan.	15 5	+87 33
	s	″		s	″		s	″		s	″		s	″
0.6	54.44	54.95	0.6	46.06	53.11	0.7	35.69	13.92	0.7	46.41	57.99	0.8	10.72	60.15
1.6	55.14	55.18	1.6	46.19	53.23	1.7	35.86	13.98	1.7	47.04	57.90	1.8	10.99	59.90
2.6	55.91	55.41	2.6	46.33	53.36	2.6	36.04	14.04	2.7	47.72	57.82	2.8	11.28	59.63
3.6	56.73	55.66	3.6	46.47	53.51	3.6	36.23	14.12	3.7	48.44	57.75	3.8	11.60	59.34
4.6	57.56	55.93	4.6	46.62	53.68	4.6	36.43	14.21	4.7	49.21	57.69	4.8	11.96	59.04
5.6	58.36	56.23	5.6	46.78	53.88	5.6	36.63	14.33	5.7	50.02	57.65	5.8	12.37	58.74
6.5	59.08	56.55	6.6	46.93	54.10	6.6	36.83	14.48	6.7	50.85	57.63	6.8	12.82	58.46
7.5	59.70	56.88	7.6	47.08	54.35	7.6	37.03	14.67	7.7	51.67	57.63	7.8	13.29	58.21
8.5	60.22	57.22	8.6	47.21	54.61	8.6	37.21	14.87	8.7	52.45	57.67	8.8	13.78	57.99
9.5	60.64	57.55	9.6	47.32	54.86	9.6	37.37	15.06	9.7	53.18	57.73	9.8	14.26	57.79
10.5	61.01	57.87	10.6	47.42	55.10	10.6	37.52	15.25	10.7	53.86	57.79	10.8	14.70	57.61
11.5	61.35	58.16	11.6	47.52	55.33	11.6	37.66	15.44	11.7	54.50	57.84	11.8	15.12	57.45
12.5	61.69	58.44	12.6	47.61	55.55	12.6	37.79	15.61	12.7	55.12	57.89	12.8	15.52	57.29
13.5	62.04	58.70	13.6	47.71	55.76	13.6	37.92	15.77	13.7	55.73	57.92	13.8	15.91	57.14
14.5	62.43	58.97	14.6	47.81	55.96	14.6	38.06	15.92	14.7	56.36	57.95	14.8	16.29	56.97
15.5	62.85	59.25	15.6	47.90	56.16	15.6	38.20	16.08	15.7	57.00	57.98	15.8	16.68	56.78
16.5	63.30	59.53	16.6	48.01	56 37	16.6	38.36	16.24	16.7	57.67	58.01	16.8	17.09	56.58
17.5	63.75	59.83	17.6	48.12	56.59	17.6	38.52	16.41	17.7	58.37	58.05	17.8	17.53	56.38
18.5	64.19	60.15	18.6	48.23	56.83	18.6	38.69	16.60	18.7	59.11	58.10	18.8	18.00	56.18
19.5	64.61	60.49	19.6	48.34	57.09	19.6	38.85	16.81	19.7	59.87	58.17	19.8	18.49	55.98
20.5	64.98	60.84	20.6	48.45	57.37	20.6	39.01	17.04	20.7	60.64	58.25	20.8	19.01	55.79
21.5	65.27	61.20	21.6	48.55	57.67	21.6	39.17	17.28	21.7	61.40	58.35	21.8	19.55	55.63
22.5	65.48	61.57	22.6	48.64	57.98	22.6	39.31	17.54	22.7	62.14	58.48	22.8	20.10	55.49
23.5	65.62	61.93	23.6	48.72	58.29	23.6	39.44	17.81	23.7	62.84	58.63	23.8	20.64	55.37
24.5	65.68	62.27	24.5	48.78	58.59	24.6	39.56	18.08	24.7	63.48	58.79	24.8	21.17	55.28
25.5	65.69	62.59	25.5	48.84	58.88	25.6	39.65	18.34	25.7	64.07	58.94	25.8	21.67	55.20
26.5	65.69	62.89	26.5	48.89	59.15	26.6	39.75	18.58	26.7	64.62	59.08	26.8	22.13	55.13
27.5	65.70	63.17	27.5	48.94	59.40	27.6	39.84	18.80	27.7	65.15	59.21	27.8	22.57	55.06
28.5	65.77	63.44	28.5	49.00	59.63	28.6	39.94	19.00	28.7	65.67	59.33	28.8	22.99	54.97
29.5	65.91	63.71	29.5	49.07	59.85	29.6	40.05	19.20	29.7	66.22	59.42	29.8	23.40	54.86
30.5	66.10	63.99	30.5	49.14	60.09	30.6	40.17	19.40	30.7	66.83	59.51	30.8	23.83	54.74
31.5	66.31	64.29	31.5	49.22	60.35	31.6	40.30	19.61	31.6	67.47	59.61	31.8	24.29	54.60
32.5	66.51	64.62	32.5	49.31	60.63	32.6	40.43	19.84	32.6	68.15	59.72	32.8	24.80	54.46
52.08 +52.07			6.94 +6.87			8.21 +8.15			31.53 +31.52			23.55 +23.52		
8^h 10^m $44^s.772$			9^h 24^m $37^s.695$			10^h 20^m $26^s.885$			12^h 14^m $26^s.635$			15^h 5^m $18^s.999$		
+88° 53′ 55″.27			+81° 42′ 59″.81			+83° 0′ 25″.01			+88° 11′ 15″.83			+87° 34′ 19″.83		

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

Groombridge 1119. Mag. 7.0			**1 H. Draconis.** Mag. 4.6			**30 H. Camelop.** Mag. 5.3			**Bradley 1672.** Mag. 6.3			**Groombridge 2283.** Mag. 7.2		
Mean Solar Date.	**Right Ascension.**	**Declination *North.***	**Mean Solar Date.**	**Right Ascension.**	**Declination *North.***	**Mean Solar Date.**	**Right Ascension.**	**Declination *North.***	**Mean Solar Date.**	**Right Ascension.**	**Declination *North.***	**Mean Solar Date.**	**Right Ascension.**	**Declination *North.***
	h m	° ′		h m	° ′		h m	° ′		h m	° ′		h m	° ′
Feb.	8 11	+88 54	Feb.	9 24	+81 43	Feb.	10 20	+83 0	Feb.	12 15	+88 10	Feb.	15 5	+87 33
	s	″		s	″		s	″		s	″		s	″
1.5	66.51	4.62	1.5	49.31	0.63	1.6	40.43	19.84	1.6	8.15	59.72	1.8	24.80	54.46
2.5	66.66	4.97	2.5	49.38	0.94	2.6	40.56	20.11	2.6	8.85	59.86	2.8	25.35	54.34
3.5	66.71	5.33	3.5	49.45	1.26	3.6	40.68	20.40	3.6	9.53	60.03	3.8	25.93	54.25
4.5	66.65	5.70	4.5	49.50	1.60	4.6	40.79	20.71	4.6	10.19	60.23	4.8	26.51	54.19
5.5	66.50	6.06	5.5	49.54	1.94	5.6	40.88	21.02	5.6	10.81	60.44	5.8	27.08	54.16
6.5	66.27	6.40	6.5	49.57	2.27	6.6	40.96	21.34	6.6	11.36	60.66	6.7	27.63	54.14
7.5	65.99	6.72	7.5	49.59	2.58	7.6	41.02	21.64	7.6	11.85	60.88	7.7	28.15	54.14
8.5	65.70	7.01	8.5	49.60	2.87	8.5	41.07	21.92	8.6	12.31	61.10	8.7	28.64	54.15
9.5	65.42	7.29	9.5	49.61	3.15	9.5	41.12	22.19	9.6	12.76	61.31	9.7	29.10	54.16
10.5	65.18	7.56	10.5	49.63	3.42	10.5	41.18	22.45	10.6	13.20	61.51	10.7	29.55	54.16
11.4	64.97	7.83	11.5	49.65	3.68	11.5	41.24	22.71	11.6	13.66	61.70	11.7	30.00	54.16
12.4	64.79	8.11	12.5	49.67	3.95	12.5	41.31	22.97	12.6	14.13	61.88	12.7	30.46	54.14
13.4	64.62	8.41	13.5	49.70	4.23	13.5	41.38	23.23	13.6	14.63	62.07	13.7	30.94	54.11
14.4	64.44	8.72	14.5	49.73	4.52	14.5	41.45	23.50	14.6	15.16	62.26	14.7	31.45	54.09
15.4	64.24	9.04	15.5	49.76	4.82	15.5	41.53	23.79	15.6	15.70	62.46	15.7	31.98	54.07
16.4	64.00	9.38	16.5	49.78	5.14	16.5	41.60	24.10	16.6	16.25	62.68	16.7	32.53	54.06
17.4	63.71	9.72	17.5	49.80	5.48	17.5	41.67	24.43	17.6	16.80	62.92	17.7	33.10	54.08
18.4	63.33	10.06	18.5	49.81	5.83	18.5	41.73	24.77	18.6	17.33	63.18	18.7	33.68	54.10
19.4	62.88	10.40	19.5	49.81	6.19	19.5	41.77	25.11	19.6	17.81	63.46	19.7	34.25	54.15
20.4	62.36	10.72	20.5	49.80	6.53	20.5	41.80	25.45	20.6	18.24	63.76	20.7	34.80	54.23
21.4	61.78	11.02	21.5	49.77	6.85	21.5	41.81	25.78	21.6	18.63	64.05	21.7	35.32	54.33
22.4	61.16	11.30	22.5	49.74	7.15	22.5	41.82	26.10	22.6	18.95	64.33	22.7	35.81	54.43
23.4	60.56	11.55	23.5	49.71	7.43	23.5	41.82	26.40	23.6	19.23	64.60	23.7	36.26	54.54
24.4	60.00	11.78	24.5	49.68	7.69	24.5	41.83	26.67	24.6	19.50	64.85	24.7	36.68	54.64
25.4	59.50	12.00	25.5	49.66	7.93	25.5	41.84	26.92	25.6	19.78	65.08	25.7	37.09	54.72
26.4	59.07	12.23	26.5	49.65	8.18	26.5	41.86	27.17	26.6	20.09	65.30	26.7	37.50	54.78
27.4	58.68	12.48	27.5	49.64	8.45	27.5	41.89	27.44	27.6	20.44	65.52	27.7	37.93	54.83
28.4	58.30	12.76	28.5	49.64	8.74	28.5	41.92	27.72	28.6	20.84	65.75	28.7	38.39	54.88
29.4	57.88	13.05	29.5	49.63	9.04	29.5	41.95	28.02	29.6	21.26	66.00	29.7	38.89	54.92
30.4	57.40	13.35	30.4	49.62	9.36	30.5	41.98	28.35	30.6	21.68	66.27	30.7	39.42	54.99
52.21		+52.20	6.94		+6.87	8.21		+8.15	31.56		+31.54	23.54		+23.52
$8^h\ 10^m\ 44^s.772$			$9^h\ 24^m\ 37^s.695$			$10^h\ 20^m\ 26^s.885$			$12^h\ 14^m\ 26^s.635$			$15^h\ 5^m\ 18^s.999$		
+88° 53′ 55″.27			+81° 42′ 59″.81			+83° 0′ 25″.01			+88° 11′ 15″.83			+87° 34′ 19″.83		

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

Groombridge 1119. Mag. 7.0			**1 H. Draconis.** Mag. 4.6			**30 H. Camelop.** Mag. 5.3			**Bradley 1672.** Mag. 6.3			**Groombridge 2283.** Mag. 7.2		
Mean Solar Date.	**Right Ascension.**	**Declination *North*.**	**Mean Solar Date.**	**Right Ascension.**	**Declination *North*.**	**Mean Solar Date.**	**Right Ascension.**	**Declination *North*.**	**Mean Solar Date.**	**Right Ascension.**	**Declination *North*.**	**Mean Solar Date.**	**Right Ascension.**	**Declination *North*.**
	h m	° ′		h m	° ′		h m	° ′		h m	° ′		h m	° ′
Mar.	8 11	+88 54	Mar.	9 24	+81 43	Mar.	10 20	+83 0	Mar.	12 15	+88 11	Mar.	15 5	+87 33
	s	″		s	″		s	″		s	″		s	″
1.4	57.40	13.35	1.4	49.62	9.36	1.5	41.98	28.35	1.6	21.68	6.27	1.7	39.42	54.99
2.4	56.82	13.65	2.4	49.60	9.69	2.5	41.99	28.69	2.6	22.07	6.57	2.7	39.96	55.10
3.4	56.14	13.94	3.4	49.56	10.03	3.5	41.99	29.04	3.6	22.40	6.90	3.7	40.49	55.23
4.4	55.37	14.21	4.4	49.51	10.35	4.5	41.97	29.38	4.6	22.68	7.23	4.7	40.99	55.39
5.4	54.56	14.46	5.4	49.45	10.65	5.5	41.94	29.71	5.6	22.90	7.55	5.7	41.46	55.57
6.4	53.72	14.69	6.4	49.38	10.93	6.5	41.90	30.02	6.6	23.06	7.87	6.7	41.89	55.76
7.4	52.89	14.90	7.4	49.31	11.19	7.5	41.86	30.31	7.6	23.20	8.18	7.7	42.29	55.95
8.4	52.10	15.09	8.4	49.24	11.44	8.5	41.82	30.59	8.5	23.33	8.48	8.7	42.67	56.12
9.4	51.34	15.27	9.4	49.18	11.68	9.5	41.78	30.85	9.5	23.46	8.76	9.7	43.04	56.28
10.4	50.61	15.46	10.4	49.12	11.92	10.5	41.74	31.12	10.5	23.60	9.03	10.7	43.42	56.44
11.4	49.91	15.66	11.4	49.07	12.17	11.5	41.71	31.39	11.5	23.77	9.30	11.7	43.81	56.59
12.4	49.23	15.87	12.4	49.02	12.42	12.5	41.69	31.67	12.5	23.97	9.57	12.7	44.21	56.73
13.4	48.54	16.09	13.4	48.97	12.68	13.5	41.67	31.96	13.5	24.18	9.85	13.7	44.63	56.87
14.4	47.83	16.32	14.4	48.92	12.96	14.5	41.65	32.26	14.5	24.40	10.14	14.6	45.07	57.02
15.4	47.07	16.56	15.4	48.86	13.25	15.4	41.62	32.57	15.5	24.62	10.45	15.6	45.52	57.18
16.4	46.25	16.79	16.4	48.80	13.55	16.4	41.58	32.89	16.5	24.82	10.78	16.6	45.98	57.36
17.4	45.36	17.02	17.4	48.72	13.84	17.4	41.53	33.22	17.5	24.98	11.13	17.6	46.43	57.56
18.4	44.39	17.24	18.4	48.63	14.13	18.4	41.47	33.55	18.5	25.09	11.49	18.6	46.87	57.79
19.3	43.37	17.43	19.4	48.53	14.40	19.4	41.40	33.87	19.5	25.15	11.84	19.6	47.27	58.04
20.3	42.33	17.60	20.4	48.43	14.65	20.4	41.32	34.17	20.5	25.15	12.18	20.6	47.63	58.30
21.3	41.29	17.75	21.4	48.32	14.88	21.4	41.23	34.44	21.5	25.10	12.50	21.6	47.95	58.55
22.3	40.28	17.87	22.4	48.22	15.09	22.4	41.14	34.69	22.5	25.02	12.81	22.6	48.24	58.80
23.3	39.34	17.98	23.4	48.12	15.28	23.4	41.05	34.92	23.5	24.94	13.10	23.6	48.50	59.03
24.3	38.48	18.08	24.4	48.03	15.46	24.4	40.98	35.14	24.5	24.89	13.37	24.6	48.75	59.25
25.3	37.66	18.19	25.4	47.96	15.63	25.4	40.91	35.36	25.5	24.88	13.63	25.6	49.02	59.45
26.3	36.88	18.32	26.4	47.89	15.82	26.4	40.85	35.60	26.5	24.91	13.88	26.6	49.32	59.63
27.3	36.09	18.47	27.4	47.82	16.03	27.4	40.79	35.85	27.5	24.97	14.15	27.6	49.65	59.81
28.3	35.26	18.63	28.4	47.75	16.27	28.4	40.73	36.12	28.5	25.04	14.46	28.6	50.00	60.01
29.3	34.35	18.80	29.4	47.67	16.52	29.4	40.66	36.41	29.5	25.09	14.79	29.6	50.37	60.23
30.3	33.35	18.96	30.4	47.57	16.77	30.4	40.58	36.70	30.5	25.10	15.13	30.6	50.73	60.48
31.3	32.27	19.11	31.4	47.46	17.00	31.4	40.48	37.00	31.5	25.05	15.47	31.6	51.07	60.75
32.3	31.14	19.24	32.4	47.34	17.21	32.4	40.37	37.27	32.5	24.92	15.81	32.6	51.37	61.04
	52.31	+52.30		6.94	+6.87		8.22	+8.16		31.59	+31.58		23.55	+23.52
$8^h\ 10^m\ 44^s.772$			$9^h\ 24^m\ 37^s.695$			$10^h\ 20^m\ 26^s.885$			$12^h\ 14^m\ 26^s.635$			$15^h\ 5^m\ 18^s.999$		
+88° 53′ 55″.27			+81° 42′ 59″.81			+83° 0′ 25″.01			+88° 11′ 15″.83			+87° 34′ 19″.83		

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

Groombridge 1119. Mag. 7.0			**1 H. Draconis.** Mag. 4.6			**30 H. Camelop.** Mag. 5.3			**Bradley 1672.** Mag. 6.3			**Groombridge 2283.** Mag. 7.2		
Mean Solar Date.	Right Ascension.	Declination *North.*	Mean Solar Date.	Right Ascension.	Declination *North.*	Mean Solar Date.	Right Ascension.	Declination *North.*	Mean Solar Date.	Right Ascension.	Declination *North.*	Mean Solar Date.	Right Ascension.	Declination *North.*
	h m	° ′		h m	° ′		h m	° ′		h m	° ′		h m	° ′
Apr.	8 10	+88 54	Apr.	9 24	+81 43	Apr.	10 20	+83 0	Apr.	12 15	+88 11	Apr.	15 5	+87 34
	s	″		s	″		s	″		s	″		s	″
1.3	91.14	19.24	1.4	47.34	17.21	1.4	40.37	37.27	1.5	24.92	15.81	1.6	51.37	1.04
2.3	89.99	19.34	2.4	47.21	17.40	2.4	40.25	37.52	2.5	24.75	16.14	2.6	51.62	1.35
3.3	88.84	19.41	3.4	47.08	17.57	3.4	40.12	37.75	3.5	24.54	16.46	3.6	51.85	1.66
4.3	87.73	19.46	4.4	46.95	17.72	4.4	39.99	37.96	4.5	24.32	16.76	4.6	52.05	1.96
5.3	86.67	19.49	5.4	46.83	17.85	5.4	39.87	38.15	5.5	24.09	17.04	5.6	52.23	2.25
6.3	85.66	19.53	6.4	46.72	17.98	6.4	39.76	38.33	6.5	23.87	17.31	6.6	52.40	2.52
7.3	84.70	19.58	7.3	46.62	18.11	7.4	39.65	38.52	7.5	23.68	17.57	7.6	52.57	2.78
8.3	83.77	19.63	8.3	46.52	18.25	8.4	39.55	38.72	8.5	23.51	17.83	8.6	52.75	3.03
9.3	82.86	19.69	9.3	46.41	18.40	9.4	39.45	38.92	9.5	23.36	18.09	9.6	52.95	3.27
10.3	81.93	19.76	10.3	46.31	18.56	10.4	39.35	39.13	10.5	23.21	18.37	10.6	53.17	3.52
11.3	80.97	19.84	11.3	46.21	18.73	11.4	39.25	39.35	11.5	23.07	18.66	11.6	53.40	3.78
12.3	79.96	19.92	12.3	46.09	18.90	12.4	39.15	39.57	12.5	22.94	18.96	12.6	53.64	4.05
13.3	78.90	20.00	13.3	45.97	19.07	13.4	39.04	39.80	13.4	22.78	19.27	13.6	53.88	4.34
14.3	77.78	20.06	14.3	45.85	19.24	14.4	38.92	40.04	14.4	22.56	19.59	14.6	54.11	4.65
15.3	76.61	20.10	15.3	45.72	19.41	15.4	38.78	40.26	15.4	22.29	19.91	15.6	54.30	4.97
16.3	75.41	20.12	16.3	45.58	19.54	16.4	38.63	40.47	16.4	21.96	20.22	16.6	54.45	5.30
17.3	74.21	20.11	17.3	45.44	19.64	17.4	38.47	40.65	17.4	21.59	20.52	17.6	54.56	5.65
18.3	73.05	20.09	18.3	45.29	19.73	18.4	38.31	40.81	18.4	21.17	20.79	18.6	54.63	5.98
19.3	71.96	20.04	19.3	45.15	19.78	19.4	38.15	40.94	19.4	20.75	21.04	19.6	54.66	6.30
20.3	70.94	19.98	20.3	45.02	19.83	20.4	38.01	41.05	20.4	20.35	21.27	20.5	54.67	6.60
21.3	70.01	19.92	21.3	44.90	19.87	21.3	37.88	41.16	21.4	19.98	21.48	21.5	54.69	6.87
22.3	69.13	19.88	22.3	44.79	19.92	22.3	37.77	41.26	22.4	19.66	21.68	22.5	54.74	7.13
23.3	68.26	19.86	23.3	44.68	19.99	23.3	37.66	41.38	23.4	19.38	21.89	23.5	54.82	7.38
24.3	67.37	19.86	24.3	44.57	20.08	24.3	37.55	41.53	24.4	19.12	22.12	24.5	54.92	7.63
25.2	66.44	19.87	25.3	44.46	20.17	25.3	37.43	41.69	25.4	18.86	22.36	25.5	55.04	7.90
26.2	65.42	19.87	26.3	44.34	20.28	26.3	37.30	41.85	26.4	18.57	22.62	26.5	55.16	8.20
27.2	64.33	19.86	27.3	44.20	20.39	27.3	37.16	42.01	27.4	18.24	22.89	27.5	55.26	8.51
28.2	63.18	19.82	28.3	44.06	20.47	28.3	37.00	42.17	28.4	17.83	23.16	28.5	55.33	8.85
29.2	62.01	19.76	29.3	43.91	20.52	29.3	36.83	42.31	29.4	17.36	23.43	29.5	55.37	9.20
30.2	60.85	19.67	30.3	43.76	20.55	30.3	36.66	42.42	30.4	16.86	23.68	30.5	55.36	9.55
31.2	59.73	19.56	31.3	43.61	20.56	31.3	36.49	42.50	31.4	16.33	23.91	31.5	55.31	9.89
32.2	58.68	19.44	32.3	43.47	20.54	32.3	36.32	42.57	32.4	15.80	24.12	32.5	55.24	10.21
	52.36	+52.35		6.95	+6.87		8.22	+8.16		31.64	+31.62		23.57	+23.54
	$8^{h}\ 10^{m}$	$44^{s}.772$		$9^{h}\ 24^{m}$	$37^{s}.695$		$10^{h}\ 20^{m}$	$26^{s}.885$		$12^{h}\ 14^{m}$	$26^{s}.635$		$15^{h}\ 5^{m}$	$18^{s}.999$
	+88° 53′	55″.27		+81° 42′	59″.81		+83° 0′	25″.01		+88° 11′	15″.83		+87° 34′	19″.83

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

Groombridge 1119. Mag. 7.0			**1 H. Draconis.** Mag. 4.6			**30 H. Camelop.** Mag. 5.3			**Bradley 1672.** Mag. 6.3			**Groombridge 2283.** Mag. 7.2		
Mean Solar Date.	Right Ascension.	Declination *North.*	Mean Solar Date.	Right Ascension.	Declination *North.*	Mean Solar Date.	Right Ascension.	Declination *North.*	Mean Solar Date.	Right Ascension.	Declination *North.*	Mean Solar Date.	Right Ascension.	Declination *North.*
	h m	° ′		h m	° ′		h m	° ′		h m	° ′		h m	° ′
May	8 10	+88 54	May	9 24	+81 43	May	10 20	+83 0	May	12 14	+88 11	May	15 5	+87 34
	s	″		s	″		s	″		s	″		s	″
1.2	59.73	19.56	1.3	43.61	20.56	1.3	36.49	42.50	1.4	76.33	23.91	1.5	55.31	9.89
2.2	58.68	19.44	2.3	43.47	20.54	2.3	36.32	42.57	2.4	75.80	24.12	2.5	55.24	10.21
3.2	57.70	19.32	3.3	43.34	20.52	3.3	36.16	42.63	3.4	75.28	24.31	3.5	55.16	10.52
4.2	56.77	19.20	4.3	43.21	20.50	4.3	36.01	42.68	4.4	74.79	24.48	4.5	55.07	10.81
5.2	55.88	19.08	5.3	43.09	20.48	5.3	35.87	42.72	5.4	74.33	24.65	5.5	55.00	11.09
6.2	55.02	18.97	6.3	42.97	20.47	6.3	35.73	42.78	6.4	73.89	24.82	6.5	54.94	11.36
7.2	54.16	18.88	7.3	42.86	20.48	7.3	35.60	42.85	7.4	73.47	25.00	7.5	54.90	11.63
8.2	53.28	18.80	8.3	42.75	20.49	8.3	35.46	42.92	8.4	73.06	25.19	8.5	54.87	11.90
9.2	52.37	18.72	9.3	42.63	20.51	9.3	35.32	43.00	9.4	72.65	25.39	9.5	54.86	12.18
10.2	51.43	18.64	10.3	42.50	20.53	10.3	35.18	43.09	10.4	72.23	25.60	10.5	54.86	12.48
11.2	50.44	18.55	11.3	42.37	20.55	11.3	35.02	43.19	11.4	71.78	25.81	11.5	54.83	12.79
12.2	49.41	18.44	12.3	42.23	20.55	12.3	34.86	43.27	12.4	71.27	26.02	12.5	54.78	13.11
13.2	48.36	18.31	13.3	42.08	20.53	13.3	34.69	43.33	13.4	70.71	26.22	13.5	54.69	13.45
14.2	47.31	18.16	14.2	41.93	20.49	14.3	34.51	43.37	14.4	70.11	26.41	14.5	54.55	13.79
15.2	46.29	17.98	15.2	41.78	20.43	15.3	34.33	43.38	15.4	69.47	26.58	15.5	54.37	14.12
16.2	45.33	17.78	16.2	41.64	20.34	16.3	34.15	43.37	16.4	68.81	26.72	16.5	54.16	14.43
17.2	44.45	17.57	17.2	41.51	20.24	17.3	33.98	43.34	17.4	68.17	26.83	17.5	53.93	14.73
18.2	43.68	17.36	18.2	41.40	20.13	18.3	33.82	43.29	18.4	67.56	26.92	18.5	53.70	15.00
19.2	42.99	17.15	19.2	41.29	20.01	19.3	33.68	43.25	19.4	66.99	27.00	19.5	53.49	15.24
20.2	42.33	16.96	20.2	41.19	19.91	20.3	33.55	43.21	20.3	66.48	27.09	20.5	53.30	15.48
21.2	41.67	16.79	21.2	41.10	19.83	21.3	33.43	43.19	21.3	66.01	27.19	21.5	53.14	15.71
22.2	40.97	16.64	22.2	41.01	19.77	22.3	33.31	43.19	22.3	65.54	27.30	22.5	53.01	15.95
23.2	40.21	16.50	23.2	40.90	19.72	23.3	33.17	43.20	23.3	65.05	27.43	23.5	52.88	16.21
24.2	39.38	16.35	24.2	40.78	19.67	24.3	33.02	43.22	24.3	64.53	27.57	24.5	52.74	16.50
25.2	38.50	16.18	25.2	40.65	19.61	25.3	32.87	43.23	25.3	63.96	27.72	25.5	52.58	16.80
26.2	37.58	15.99	26.2	40.52	19.53	26.3	32.70	43.22	26.3	63.33	27.86	26.4	52.38	17.11
27.2	36.68	15.77	27.2	40.38	19.42	27.2	32.52	43.18	27.3	62.65	27.98	27.4	52.13	17.42
28.2	35.82	15.53	28.2	40.24	19.29	28.2	32.33	43.12	28.3	61.95	28.09	28.4	51.85	17.73
29.2	35.01	15.27	29.2	40.11	19.13	29.2	32.16	43.04	29.3	61.25	28.17	29.4	51.54	18.02
30.2	34.28	15.00	30.2	39.99	18.95	30.2	32.00	42.95	30.3	60.55	28.22	30.4	51.22	18.29
31.1	33.62	14.73	31.2	39.88	18.78	31.2	31.84	42.84	31.3	59.87	28.25	31.4	50.90	18.54
32.1	33.02	14.48	32.2	39.77	18.61	32.2	31.70	42.74	32.3	59.23	28.28	32.4	50.59	18.77
52.33 +52.32			6.95 +6.87			8.22 +8.16			31.67 +31.66			23.59 +23.57		
8h 10m 44s.772			9h 24m 37s.695			10h 20m 26s.885			12h 14m 26s.635			15h 5m 18s.999		
+88° 53′ 55″.27			+81° 42′ 59″.81			+83° 0′ 25″.01			+88° 11′ 15″.83			+87° 34′ 19″.83		

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

Groombridge 1119. Mag. 7.0			**1 H. Draconis.** Mag. 4.6			**30 H. Camelop.** Mag. 5.3			**Bradley 1672.** Mag. 6.3			**Groombridge 2283.** Mag. 7.2		
Mean Solar Date.	Right Ascension.	Declination *North.*	Mean Solar Date.	Right Ascension.	Declination *North.*	Mean Solar Date.	Right Ascension.	Declination *North.*	Mean Solar Date.	Right Ascension.	Declination *North.*	Mean Solar Date.	Right Ascension.	Declination *North.*
	h m	° ′		h m	° ′		h m	° ′		h m	° ′		h m	°
June	8 10	+88 54	June	9 24	+81 43	June	10 20	+83 0	June	12 14	+88 11	June	15 5	+87 34
	s	″		s	″		s	″		s	″		s	″
1.1	33.02	14.48	1.2	39.77	18.61	1.2	31.70	42.74	1.3	59.23	28.28	1.4	50.59	18.77
2.1	32.46	14.24	2.2	39.67	18.45	2.2	31.57	42.64	2.3	58.62	28.31	2.4	50.30	18.99
3.1	31.92	14.01	3.2	39.58	18.30	3.2	31.44	42.55	3.3	58.05	28.34	3.4	50.02	19.20
4.1	31.38	13.79	4.2	39.49	18.16	4.2	31.31	42.46	4.3	57.50	28.38	4.4	49.76	19.40
5.1	30.83	13.57	5.2	39.40	18.04	5.2	31.19	42.38	5.3	56.96	28.43	5.4	49.51	19.61
6.1	30.25	13.36	6.2	39.31	17.92	6.2	31.06	42.31	6.3	56.41	28.48	6.4	49.26	19.84
7.1	29.63	13.16	7.2	39.21	17.79	7.2	30.92	42.25	7.3	55.83	28.54	7.4	49.01	20.08
8.1	28.97	12.95	8.2	39.10	17.66	8.2	30.77	42.18	8.3	55.22	28.61	8.4	48.75	20.33
9.1	28.28	12.71	9.2	38.98	17.51	9.2	30.62	42.10	9.3	54.56	28.67	9.4	48.46	20.59
10.1	27.59	12.44	10.2	38.86	17.34	10.2	30.46	42.00	10.3	53.86	28.72	10.4	48.12	20.86
11.1	26.93	12.14	11.2	38.74	17.14	11.2	30.29	41.87	11.3	53.13	28.74	11.4	47.74	21.12
12.1	26.33	11.83	12.2	38.63	16.92	12.2	30.13	41.71	12.3	52.37	28.74	12.4	47.33	21.37
13.1	25.81	11.51	13.2	38.54	16.68	13.2	29.97	41.52	13.3	51.62	28.72	13.4	46.89	21.59
14.1	25.39	11.18	14.2	38.46	16.42	14.2	29.82	41.32	14.3	50.90	28.67	14.4	46.44	21.79
15.1	25.06	10.86	15.2	38.38	16.16	15.2	29.69	41.12	15.3	50.23	28.60	15.4	46.00	21.96
16.1	24.79	10.56	16.2	38.31	15.92	16.2	29.58	40.92	16.3	49.61	28.52	16.4	45.58	22.11
17.1	24.56	10.29	17.2	38.24	15.70	17.2	29.48	40.74	17.3	49.04	28.45	17.4	45.20	22.25
18.1	24.31	10.03	18.2	38.18	15.50	18.2	29.38	40.58	18.3	48.49	28.40	18.4	44.85	22.39
19.1	24.01	9.79	19.1	38.12	15.31	19.2	29.28	40.45	19.3	47.94	28.37	19.4	44.52	22.54
20.1	23.64	9.55	20.1	38.05	15.13	20.2	29.16	40.32	20.3	47.37	28.36	20.4	44.19	22.72
21.1	23.21	9.29	21.1	37.97	14.95	21.2	29.03	40.18	21.3	46.77	28.35	21.4	43.84	22.91
22.1	22.75	9.01	22.1	37.88	14.75	22.2	28.90	40.04	22.3	46.12	28.33	22.4	43.46	23.11
23.1	22.28	8.70	23.1	37.78	14.52	23.2	28.76	39.87	23.3	45.41	28.30	23.4	43.05	23.31
24.1	21.83	8.37	24.1	37.68	14.27	24.2	28.62	39.68	24.3	44.67	28.25	24.4	42.60	23.52
25.1	21.45	8.03	25.1	37.59	13.99	25.2	28.47	39.47	25.3	43.92	28.19	25.4	42.11	23.72
26.1	21.15	7.68	26.1	37.51	13.70	26.2	28.33	39.23	26.2	43.18	28.11	26.4	41.60	23.90
27.1	20.92	7.33	27.1	37.44	13.41	27.2	28.20	38.99	27.2	42 47	28.00	27.4	41.10	24.05
28.1	20.75	6.99	28.1	37.38	13.12	28.2	28.09	38.74	28.2	41.80	27.87	28.4	40.62	24.19
29.1	20.64	6.66	29.1	37.33	12.84	29.2	27.99	38.50	29.2	41.17	27.73	29.4	40.15	24.31
30.1	20.56	6.34	30.1	37.29	12.57	30.2	27.90	38.26	30.2	40.58	27.60	30.4	39.69	24.41
31.1	20.50	6.04	31.1	37.25	12.31	31.2	27.81	38.04	31.2	40.01	27.49	31.4	39.25	24.51
32.1	20.42	5.75	32.1	37.20	12.07	32.2	27.73	37.83	32.2	39.46	27.39	32.3	38.83	24.61
	52.24	+52.22		6.94	+6.87		8.22	+8.16		31.68	+31.67		23.61	+23.59
8^{h} 10^{m} 44^{s}.772			9^{h} 24^{m} 37^{s}.695			10^{h} 20^{m} 26^{s}.885			12^{h} 14^{m} 26^{s}.635			15^{h} 5^{m} 18^{s}.999		
+88° 53′ 55″.27			+81° 42′ 59″.81			+83° 0′ 25″.01			+88° 11′ 15″.83			+87° 34′ 19″.83		

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

Groombridge 1119. Mag. 7.0			**1 H. Draconis.** Mag. 4.6			**30 H. Camelop.** Mag. 5.3			**Bradley 1672.** Mag. 6.3			**Groombridge 2283.** Mag. 7.2		
Mean Solar Date.	Right Ascension.	Declination *North.*	Mean Solar Date.	Right Ascension.	Declination *North.*	Mean Solar Date.	Right Ascension.	Declination *North.*	Mean Solar Date.	Right Ascension.	Declination *North.*	Mean Solar Date.	Right Ascension.	Declination *North.*
	h m	° ′		h m	° ′		h m	° ′		h m	° ′		h m	° ′
July	8 10	+88 53	July	9 24	+81 43	July	10 20	+83 0	July	12 14	+88 11	July	15 5	+87 34
	s	″		s	″		s	″		s	″		s	″
1.1	20.50	66.04	1.1	37.25	12.31	1.2	27.81	38.04	1.2	40.01	27.49	1.4	39.25	24.51
2.1	20.42	65.75	2.1	37.20	12.07	2.2	27.73	37.83	2.2	39.46	27.39	2.3	38.83	24.61
3.1	20.32	65.47	3.1	37.15	11.83	3.1	27.65	37.64	3.2	38.92	27.28	3.3	38.43	24.71
4.1	20.19	65.19	4.1	37.10	11.60	4.1	27.56	37.44	4.2	38.37	27.19	4.3	38.02	24.82
5.1	20.02	64.91	5.1	37.04	11.37	5.1	27.46	37.24	5.2	37.78	27.10	5.3	37.60	24.95
6.1	19.82	64.61	6.1	36.98	11.12	6.1	27.36	37.03	6.2	37.16	27.01	6.3	37.16	25.09
7.0	19.61	64.29	7.1	36.92	10.86	7.1	27.24	36.80	7.2	36.50	26.91	7.3	36.70	25.24
8.0	19.42	63.95	8.1	36.86	10.58	8.1	27.12	36.55	8.2	35.81	26.80	8.3	36.20	25.39
9.0	19.28	63.59	9.1	36.80	10.27	9.1	27.00	36.28	9.2	35.10	26.66	9.3	35.66	25.53
10.0	19.21	63.21	10.1	36.75	9.93	10.1	26.89	35.99	10.2	34.38	26.49	10.3	35.09	25.65
11.0	19.24	62.83	11.1	36.70	9.57	11.1	26.79	35.67	11.2	33.69	26.30	11.3	34.50	25.73
12.0	19.37	62.45	12.1	36.67	9.22	12.1	26.71	35.34	12.2	33.05	26.09	12.3	33.92	25.77
13.0	19.59	62.08	13.1	36.66	8.88	13.1	26.65	35.02	13.2	32.46	25.86	13.3	33.36	25.79
14.0	19.85	61.74	14.1	36.65	8.56	14.1	26.59	34.71	14.2	31.92	25.64	14.3	32.83	25.81
15.0	20.11	61.42	15.1	36.64	8.26	15.1	26.54	34.42	15.2	31.42	25.43	15.3	32.34	25.82
16.0	20.34	61.13	16.1	36.63	7.98	16.1	26.49	34.15	16.2	30.94	25.24	16.3	31.88	25.84
17.0	20.51	60.84	17.1	36.61	7.71	17.1	26.43	33.90	17.2	30.46	25.06	17.3	31.43	25.87
18.0	20.61	60.54	18.1	36.59	7.44	18.1	26.36	33.65	18.2	29.95	24.90	18.3	30.97	25.93
19.0	20.66	60.22	19.1	36.56	7.16	19.1	26.28	33.39	19.2	29.39	24.74	19.3	30.48	26.00
20.0	20.69	59.89	20.1	36.53	6.86	20.1	26.20	33.12	20.2	28.79	24.57	20.3	29.97	26.08
21.0	20.74	59.54	21.1	36.49	6.54	21.1	26.11	32.82	21.2	28.16	24.38	21.3	29.43	26.16
22.0	20.84	59.17	22.1	36.46	6.20	22.1	26.02	32.50	22.2	27.50	24.18	22.3	28.85	26.22
23.0	21.02	58.79	23.1	36.43	5.85	23.1	25.94	32.17	23.2	26.84	23.97	23.3	28.25	26.27
24.0	21.26	58.41	24.1	36.41	5.48	24.1	25.87	31.84	24.2	26.22	23.74	24.3	27.65	26.30
24.9	21.57	58.04	25.1	36.40	5.10	25.1	25.82	31.50	25.2	25.64	23.48	25.3	27.06	26.30
25.9	21.95	57.68	26.0	36.40	4.74	26.1	25.77	31.15	26.2	25.10	23.21	26.3	26.48	26.29
26.9	22.37	57.34	27.0	36.41	4.40	27.1	25.74	30.81	27.2	24.60	22.94	27.3	25.93	26.25
27.9	22.81	57.02	28.0	36.43	4.08	28.1	25.71	30.49	28.2	24.14	22.68	28.3	25.41	26.21
28.9	23.24	56.72	29.0	36.45	3.78	29.1	25.68	30.18	29.2	23.71	22.43	29.3	24.91	26.17
29.9	23.66	56.42	30.0	36.47	3.48	30.1	25.66	29.88	30.2	23.29	22.19	30.3	24.42	26.13
30.9	24.05	56.13	31.0	36.48	3.18	31.1	25.63	29.60	31.2	22.87	21.97	31.3	23.95	26.11
31.9	24.39	55.83	32.0	36.49	2.88	32.1	25.60	29.32	32.1	22.43	21.75	32.3	23.46	26.09
	52.11	+52.10		6.94	+6.87		8.22	+8.16		31.67	+31.65		23.62	+23.60
$8^h\ 10^m\ 44^s.772$			$9^h\ 24^m\ 37^s.695$			$10^h\ 20^m\ 26^s.885$			$12^h\ 14^m\ 26^s.635$			$15^h\ 5^m\ 18^s.999$		
+88° 53′ 55″.27			+81° 42′ 59″.81			+83° 0′ 25″.01			+88° 11′ 15″.83			+87° 34′ 19″.83		

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

Groombridge 1119. Mag. 7.0			**1 H. Draconis.** Mag. 4.6			**30 H. Camelop.** Mag. 5.3			**Bradley 1672.** Mag. 6.3			**Groombridge 2283.** Mag. 7.2		
Mean Solar Date.	**Right Ascension.**	**Declination *North.***	**Mean Solar Date.**	**Right Ascension.**	**Declination *North.***	**Mean Solar Date.**	**Right Ascension.**	**Declination *North.***	**Mean Solar Date.**	**Right Ascension.**	**Declination *North.***	**Mean Solar Date.**	**Right Ascension.**	**Declination *North.***
	h m	° ′		h m	° ′		h m	° ′		h m	° ′		h m	° ′
Aug.	8 10	+88 53	Aug.	9 24	+81 42	Aug.	10 20	+83 0	Aug.	12 14	+88 11	Aug.	15 5	+87 34
	s	″		s	″		s	″		s	″		s	″
1.9	24.71	55.53	1.0	36.49	62.88	1.1	25.60	29.32	1.1	22.43	21.75	1.3	23.46	26.09
2.9	25.00	55.21	2.0	36.50	62.58	2.1	25.56	29.03	2.1	21.96	21.53	2.3	22.96	26.08
3.9	25.29	54.87	3.0	36.49	62.27	3.1	25.51	28.73	3.1	21.45	21.31	3.3	22.45	26.08
4.9	25.62	54.52	4.0	36.48	61.94	4.1	25.46	28.41	4.1	20.91	21.07	4.3	21.90	26.09
5.9	26.01	54.15	5.0	36.49	61.59	5.1	25.40	28.07	5.1	20.34	20.81	5.3	21.31	26.08
6.9	26.49	53.77	6.0	36.49	61.21	6.1	25.35	27.71	6.1	19.76	20.53	6.3	20.69	26.07
7 9	27.08	53.39	7.0	36.50	60.82	7.1	25.31	27.33	7.1	19.20	20.22	7.3	20.06	26.03
8.9	27.76	53.03	8.0	36.53	60.43	8.1	25.28	26.93	8.1	18.69	19.89	8.2	19.43	25.95
9.9	28.49	52.69	9.0	36.57	60.05	9.0	25.26	26.53	9.1	18.24	19.55	9.2	18.82	25.84
10.9	29.24	52.37	10.0	36.62	59.68	10.0	25.27	26.14	10.1	17.84	19.20	10.2	18.23	25.72
11.9	29.97	52.08	11.0	36.68	59.33	11.0	25.29	25.78	11.1	17.50	18.86	11.2	17.69	25.59
12.9	30.65	51.80	12.0	36.73	59.00	12.0	25.31	25.44	12.1	17.19	18.55	12.2	17.19	25.46
13.9	31.27	51.52	12.9	36.78	58.69	13.0	25.32	25.11	13.1	16.88	18.25	13.2	16.70	25.34
14.9	31.82	51.23	13.9	36.82	58.38	14.0	25.32	24.80	14.1	16.55	17.96	14.2	16.22	25.25
15.9	32.33	50.93	14.9	36.86	58.07	15.0	25.32	24.48	15.1	16.18	17.68	15.2	15.72	25.17
16.9	32.85	50.60	15.9	36.89	57.75	16.0	25.31	24.15	16.1	15.76	17.41	16.2	15.20	25.11
17.9	33.40	50.25	16.9	36.91	57.41	17.0	25.29	23.81	17.1	15.31	17.12	17.2	14.65	25.05
18.9	34.02	49.90	17.9	36.94	57.04	18.0	25.27	23.45	18.1	14.85	16.82	18.2	14.06	24.98
19.9	34.70	49.55	18.9	36.97	56.65	19.0	25.26	23.07	19.1	14.39	16.50	19.2	13.45	24.89
20.9	35.47	49.20	19.9	37.01	56.26	20.0	25.25	22.67	20.1	13.95	16.16	20.2	12.83	24.78
21.9	36.29	48.87	20.9	37.06	55.88	21.0	25.26	22.27	21.1	13.54	15.80	21.2	12.23	24.65
22.9	37.16	48.56	21.9	37.13	55.50	22.0	25.28	21.87	22.1	13.17	15.43	22.2	11.65	24.51
23.9	38.05	48.27	22.9	37.20	55.14	23.0	25.31	21.48	23.1	12.85	15.06	23.2	11.09	24.35
24.9	38.94	47.99	23.9	37.28	54.80	24.0	25.34	21.10	24.1	12.57	14.69	24.2	10.56	24.18
25.9	39.81	47.72	24.9	37.36	54.47	25.0	25.39	20.74	25.1	12.32	14.33	25.2	10.05	24.00
26.9	40.65	47.47	25.9	37.44	54.15	26.0	25.44	20.40	26.1	12.10	13.98	26.2	9.56	23.82
27.9	41.45	47.22	26.9	37.51	53.85	26.9	25.48	20.07	27.1	11.89	13.65	27.2	9.09	23.65
28.9	42.21	46.96	27.9	37.58	53.55	27.9	25.52	19.74	28.1	11.67	13.33	28.2	8.63	23.49
29.9	42.95	46.69	28.9	37.64	53.25	28.9	25.55	19.42	29.1	11.44	13.02	29.2	8.17	23.35
30.9	43.67	46.41	29.9	37.70	52.95	29.9	25.58	19.09	30.1	11.16	12.71	30.2	7.69	23.21
31.9	44.40	46.12	30.9	37.75	52.63	30.9	25.60	18.75	31.1	10.85	12.39	31.2	7.17	23.08
32.9	45.19	45.80	31.9	37.81	52.29	31.9	25.61	18.38	32.1	10.51	12.06	32.2	6.63	22.95
	51.97	+51.96		6.94	+6.87		8.21	+8.15		31.63	+31.61		23.62	+23.60
$8^h\ 10^m\ 44^s.772$			$9^h\ 24^m\ 37^s.695$			$10^h\ 20^m\ 26^s.885$			$12^h\ 14^m\ 26^s.635$			$15^h\ 5^m\ 18^s.999$		
+88° 53′ 55″.27			+81° 42′ 59″.81			+83° 0′ 25″.01			+88° 11′ 15″.83			+87° 34′ 19″.83		

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

Groombridge 1119. Mag. 7.0			**1 H. Draconis.** Mag. 4.6			**30 H. Camelop.** Mag. 5.3			**Bradley 1672.** Mag. 6.3			**Groombridge 2283.** Mag. 7.2		
Mean Solar Date.	Right Ascension.	Declination *North*.	Mean Solar Date.	Right Ascension.	Declination *North*.	Mean Solar Date.	Right Ascension.	Declination *North*.	Mean Solar Date.	Right Ascension.	Declination *North*.	Mean Solar Date.	Right Ascension.	Declination *North*.
	h m	° ′		h m	° ′		h m	° ′		h m	° ′		h m	° ′
Sept.	8 10	+88 53	Sept.	9 24	+81 42	Sept.	10 20	+83 0	Sept.	12 14	+88 11	Sept.	15 4	+87 34
	s	″		s	″		s	″		s	″		s	″
1.9	45.19	45.80	1.9	37.87	51.92	1.9	25.63	17.99	1.1	10.51	12.06	1.2	66.63	22.95
2.9	46.06	45.47	2.9	37.93	51.54	2.9	25.65	17.59	2.1	10.16	11.71	2.2	66.06	22.81
3.9	47.02	45.14	3.9	38.01	51.15	3.9	25.69	17.18	3.1	9.81	11.33	3.2	65.47	22.64
4.9	48.06	44.83	4.9	38.11	50.76	4.9	25.74	16.76	4.1	9.50	10.92	4.2	64.88	22.44
5.9	49.18	44.54	5.9	38.22	50.39	5.9	25.81	16.36	5.1	9.25	10.50	5.2	64.30	22.21
6.9	50.33	44.28	6.9	38.33	50.05	6.9	25.90	15.96	6.1	9.07	10.08	6.2	63.74	21.95
7.9	51.47	44.04	7.9	38.45	49.73	7.9	25.99	15.59	7.0	8.95	9.67	7.2	63.23	21.68
8.9	52.57	43.82	8.9	38.56	49.43	8.9	26.08	15.24	8.0	8.86	9.27	8.2	62.77	21.42
9.9	53.60	43.60	9.9	38.67	49.14	9.9	26.16	14.91	9.0	8.79	8.89	9.2	62.34	21.17
10.9	54.56	43.38	10.9	38.77	48.86	10.9	26.23	14.59	10.0	8.71	8.54	10.2	61.92	20.94
11.9	55.48	43.15	11.9	38.86	48.57	11.9	26.29	14.27	11.0	8.60	8.20	11.2	61.49	20.73
12.9	56.38	42.90	12.9	38.94	48.26	12.9	26.34	13.93	12.0	8.44	7.85	12.2	61.04	20.54
13.9	57.30	42.63	13.9	39.02	47.93	13.9	26.39	13.56	13.0	8.25	7.50	13.1	60.56	20.35
14.9	58.26	42.35	14.9	39.11	47.58	14.9	26.44	13.17	14.0	8.04	7.14	14.1	60.05	20.15
15.9	59.30	42.07	15.9	39.20	47.22	15.9	26.50	12.78	15.0	7.82	6.76	15.1	59.52	19.94
16.9	60.40	41.80	16.9	39.31	46.86	16.9	26.57	12.38	16.0	7.62	6.36	16.1	58.99	19.72
17.8	61.56	41.54	17.9	39.43	46.52	17.9	26.66	11.98	17.0	7.45	5.95	17.1	58.46	19.48
18.8	62.77	41.29	18.9	39.55	46.19	18.9	26.76	11.59	18.0	7.33	5.53	18.1	57.95	19.21
19.8	64.00	41.06	19.9	39.68	45.87	19.9	26.86	11.22	19.0	7.25	5.11	19.1	57.47	18.92
20.8	65.23	40.86	20.9	39.82	45.57	20.9	26.98	10.86	20.0	7.22	4.69	20.1	57.02	18.62
21.8	66.44	40.68	21.9	39.95	45.28	21.9	27.10	10.52	21.0	7.22	4.28	21.1	56.59	18.32
22.8	67.62	40.51	22.9	40.08	45.01	22.9	27.22	10.19	22.0	7.25	3.89	22.1	56.19	18.03
23.8	68.77	40.34	23.9	40.21	44.76	23.9	27.33	9.87	23.0	7.30	3.51	23.1	55.81	17.74
24.8	69.88	40.18	24.9	40.33	44.50	24.9	27.43	9.57	24.0	7.35	3.14	24.1	55.45	17.46
25.8	70.95	40.01	25.9	40.44	44.24	25.9	27.52	9.26	24.9	7.38	2.78	25.1	55.09	17.19
26.8	71.99	39.83	26.9	40.55	43 97	26.9	27.61	8.94	25.9	7.38	2.43	26.1	54.71	16.94
27.8	73.03	39.63	27.9	40.66	43.69	27.9	27.70	8.62	26.9	7.35	2.09	27.1	54.31	16.70
28.8	74.10	39.41	28.9	40.77	43.39	28.9	27.78	8.28	27.9	7.29	1.73	28.1	53.89	16.45
29.8	75.22	39.18	29.9	40.89	43.07	29.9	27.87	7.92	28.9	7.21	1.36	29.1	53.45	16.20
30.8	76.43	38.96	30.9	41.01	42.73	30.9	27.97	7.53	29.9	7.13	0.96	30.1	52.99	15.94
31.8	77.72	38.75	31.9	41.15	42.40	31.9	28.09	7.14	30.9	7.08	0.54	31.1	52.52	15.65
32.8	79.09	38.56	32.9	41.31	42.09	32.9	28.23	6.75	31.9	7.08	0.10	32.1	52.06	15.32
	51.86	+51.85		6.94	+6.87		8.21	+8.15		31.58	+31.56		23.61	+23.59
8^{h} 10^{m} $44^{s}.772$			9^{h} 24^{m} $37^{s}.695$			10^{h} 20^{m} $26^{s}.885$			12^{h} 14^{m} $26^{s}.635$			15^{h} 5^{m} $18^{s}.999$		
+88° 53′ 55″.27			+81° 42′ 59″.81			+83° 0′ 25″.01			+88° 11′ 15″.83			+87° 34′ 19″.83		

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

Groombridge 1119. Mag. 7.0			**1 H. Draconis.** Mag. 4.6			**30 H. Camelop.** Mag. 5.3			**Bradley 1672.** Mag. 6.3			**Groombridge [illegible].** Mag. 7.2		
Mean Solar Date.	Right Ascension.	Declination *North*.	Mean Solar Date.	Right Ascension.	Declination *North*.	Mean Solar Date.	Right Ascension.	Declination *North*.	Mean Solar Date.	Right Ascension.	Declination *North*.	Mean Solar Date.	Right Ascension.	Declination *North*.
	h m	° ′		h m	° ′		h m	° ′		h m	° ′		h m	° ′
Oct.	8 11	+88 53	Oct.	9 24	+81 42	Oct.	10 20	+82 59	Oct.	12 14	+88 10	Oct.	15 4	+87 34
	s	″		s	″		s	″		s	″		s	″
1.8	17.72	38.75	1.9	41.15	42.40	1.9	28.09	67.14	1.9	7.08	60.10	1.1	52.52	15.65
2.8	19.09	38.56	2.9	41.31	42.09	2.9	28.23	66.75	2.9	7.14	59.66	2.1	52.06	15.32
3.8	20.51	38.39	3.9	41.47	41.80	3.9	28.37	66.39	3.9	7.26	59.23	3.1	51.63	14.98
4.8	21.93	38.24	4.9	41.63	41.53	4.9	28.52	66.05	4.9	7.43	58.80	4.1	51.23	14.62
5.8	23.31	38.11	5.9	41.79	41.29	5.9	28.68	65.74	5.9	7.63	58.40	5.1	50.88	14.25
6.8	24.63	38.00	6.8	41.95	41.07	6.9	28.83	65.46	6.9	7.84	58.01	6.1	50.57	13.90
7.8	25.87	37.90	7.8	42.11	40.87	7.9	28.97	65.18	7.9	8.02	57.66	7.1	50.29	13.56
8.8	27.04	37.79	8.8	42.25	40.65	8.9	29.10	64.89	8.9	8.17	57.31	8.1	50.01	13.24
9.8	28.18	37.66	9.8	42.38	40.42	9.9	29.22	64.60	9.9	8.27	56.96	9.1	49.72	12.94
10.8	29.31	37.51	10.8	42.51	40.17	10.9	29.34	64.30	10.9	8.34	56.60	10.1	49.40	12.66
11.8	30.48	37.35	11.8	42.64	39.90	11.9	29.45	63.98	11.9	8.40	56.22	11.1	49.05	12.37
12.8	31.70	37.17	12.8	42.78	39.62	12.9	29.57	63.65	12.9	8.47	55.82	12.1	48.69	12.07
13.8	32.99	37.00	13.8	42.92	39.34	13.9	29.70	63.31	13.9	8.57	55.41	13.1	48.31	11.77
14.8	34.35	36.85	14.8	43.07	39.07	14.9	29.85	62.97	14.9	8.70	54.99	14.1	47.93	11.43
15.8	35.74	36.72	15.8	43.24	38.80	15.9	30.01	62.64	15.9	8.88	54.57	15.1	47.57	11.08
16.8	37.16	36.61	16.8	43.41	38.56	16.9	30.17	62.33	16.9	9.11	54.16	16.1	47.23	10.71
17.8	38.59	36.52	17.8	43.58	38.34	17.9	30.34	62.03	17.9	9.38	53.76	17.1	46.93	10.33
18.8	40.00	36.45	18.8	43.76	38.14	18.9	30.51	61.74	18.9	9.69	53.38	18.1	46.66	9.95
19.8	41.38	36.40	19.8	43.94	37.96	19.9	30.69	61.47	19.9	10.02	53.01	19.1	46.42	9.57
20.8	42.70	36.35	20.8	44.11	37.79	20.8	30.86	61.23	20.9	10.34	52.66	20.0	46.22	9.20
21.8	43.98	36.31	21.8	44.27	37.63	21.8	31.03	61.00	21.9	10.65	52.32	21.0	46.03	8.84
22.8	45.22	36.27	22.8	44.43	37.48	22.8	31.19	60.76	22.9	10.94	51.98	22.0	45.85	8.50
23.8	46.42	36.22	23.8	44.58	37.31	23.8	31.34	60.52	23.9	11.21	51.65	23.0	45.66	8.17
24.7	47.60	36.15	24.8	44.73	37.13	24.8	31.49	60.28	24.9	11.45	51.32	24.0	45.46	7.85
25.7	48.79	36.06	25.8	44.88	36.93	25.8	31.64	60.02	25.9	11.66	50.97	25.0	45.24	7.53
26.7	50.03	35.97	26.8	45.03	36.72	26.8	31.77	59.74	26.9	11.86	50.61	26.0	44.99	7.20
27.7	51.32	35.87	27.8	45.19	36.50	27.8	31.92	59.45	27.9	12.07	50.24	27.0	44.72	6.87
28.7	52.70	35.78	28.8	45.35	36.28	28.8	32.09	59.15	28.9	12.32	49.85	28.0	44.44	6.51
29.7	54.15	35.70	29.8	45.53	36.06	29.8	32.27	58.86	29.9	12.63	49.44	29.0	44.18	6.13
30.7	55.65	35.64	30.8	45.72	35.87	30.8	32.47	58.58	30.9	13.00	49.04	30.0	43.93	5.73
31.7	57.16	35.62	31.8	45.92	35.71	31.8	32.68	58.32	31.9	13.42	48.65	31.0	43.71	5.31
32.7	58.64	35.63	32.8	46.12	35.58	32.8	32.89	58.08	32.9	13.89	48.28	32.0	43.55	4.88
	51.79	+51.78		6.94	+6.86		8.21	+8.15		31.52	+31.50		23.58	+23.56
	$8^{h}\ 10^{m}$	$44^{s}.772$		$9^{h}\ 24^{m}$	$37^{s}.695$		$10^{h}\ 20^{m}$	$26^{s}.885$		$12^{h}\ 14^{m}$	$26^{s}.635$		$15^{h}\ 5^{m}$	$18^{s}.999$
+88°	53′	55″.27	+81°	42′	59″.81	+83°	0′	25″.01	+88°	11′	15″.83	+87°	34′	19″.83

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

Groombridge 1119. Mag. 7.0			**1 H. Draconis.** Mag. 4.6			**30 H. Camelop.** Mag. 5.3			**Bradley 1672.** Mag. 6.3			**Groombridge 2283.** Mag. 7.2		
Mean Solar Date.	Right Ascension.	Declination *North.*	Mean Solar Date.	Right Ascension.	Declination *North.*	Mean Solar Date	Right Ascension.	Declination *North.*	Mean Solar Date.	Right Ascension.	Declination *North.*	Mean Solar Date.	Right Ascension.	Declination *North.*
	h m	° ′		h m	° ′		h m	° ′		h m	° ′		h m	° ′
Nov.	8 11	+88 53	Nov.	9 24	+81 42	Nov.	10 20	+82 59	Nov.	12 14	+88 10	Nov.	15 4	+87 33
	s	″		s	″		s	″		s	″		s	″
1.7	58.64	35.63	1.8	46.12	35.58	1.8	32.89	58.08	1.9	13.89	48.28	1.0	43.55	64.88
2.7	60.06	35.66	2.8	46.31	35.46	2.8	33.09	57.88	2.9	14.37	47.95	2.0	43.44	64.46
3.7	61.40	35.69	3.8	46.49	35.36	3.8	33.29	57.70	3.9	14.84	47.63	3.0	43.35	64.06
4.7	62.65	35.72	4.8	46.67	35.27	4.8	33.48	57.53	4.9	15.29	47.32	4.0	43.28	63.68
5.7	63.85	35.73	5.8	46.83	35.17	5.8	33.66	57.35	5.9	15.68	47.04	5.0	43.20	63.32
6.7	65.02	35.73	6.8	46.99	35.06	6.8	33.82	57.16	6.9	16.02	46.75	6.0	43.11	62.99
7.7	66.21	35.71	7.8	47.15	34.93	7.8	33.98	56.95	7.9	16.34	46.44	6.9	42.99	62.66
8.7	67.43	35.68	8.8	47.31	34.78	8.8	34.14	56.74	8.9	16.66	46.11	7.9	42.84	62.33
9.7	68.72	35.66	9.8	47.48	34.62	9.8	34.31	56.52	9.9	17.00	45.77	8.9	42.68	61.99
10.7	70.07	35.64	10.8	47.66	34.47	10.8	34.49	56.28	10.9	17.39	45.43	9.9	42.53	61.63
11.7	71.46	35.64	11.8	47.84	34.33	11.8	34.68	56.05	11.9	17.83	45.08	10.9	42.39	61.25
12.7	72.88	35.66	12.7	48.02	34.21	12.8	34.89	55.84	12.9	18.31	44.73	11.9	42.26	60.85
13.7	74.30	35.71	13.7	48.21	34.11	13.8	35.11	55.66	13.9	18.84	44.39	12.9	42.16	60.43
14.7	75.70	35.78	14.7	48.41	34.03	14.8	35.34	55.49	14.9	19.40	44.07	13.9	42.10	60.02
15.7	77.06	35.86	15.7	48.61	33.98	15.8	35.56	55.35	15.9	19.97	43.78	14.9	42.08	59.61
16.7	78.37	35.96	16.7	48.81	33.94	16.8	35.77	55.22	16.9	20.55	43.51	15.9	42.09	59.20
17.7	79.63	36.06	17.7	49.00	33.91	17.8	35.97	55.11	17.9	21.13	43.25	16.9	42.12	58.80
18.7	80.82	36.16	18.7	49.18	33.89	18.8	36.16	55.01	18.8	21.70	43.00	17.9	42.17	58.43
19.7	81.96	36.26	19.7	49.35	33.86	19.8	36.35	54.90	19.8	22.23	42.75	18.9	42.23	58.07
20.7	83.07	36.35	20.7	49.51	33.82	20.8	36.54	54.79	20.8	22.72	42.51	19.9	42.28	57.72
21.7	84.18	36.42	21.7	49.67	33.77	21.8	36.72	54.67	21.8	23.19	42.27	20.9	42.31	57.39
22.7	85.31	36.48	22.7	49.83	33.71	22.8	36.89	54.54	22.8	23.63	42.01	21.9	42.32	57.06
23.7	86.48	36.53	23.7	50.00	33.64	23.8	37.08	54.39	23.8	24.08	41.73	22.9	42.30	56.73
24.7	87.72	36.58	24.7	50.17	33.56	24.8	37.28	54.22	24.8	24.56	41.43	23.9	42.26	56.38
25.7	89.04	36.64	25.7	50.35	33.48	25.8	37.49	54.06	25.8	25.08	41.13	24.9	42.22	56.01
26.7	90.41	36.73	26.7	50.55	33.42	26.7	37.71	53.91	26.8	25.67	40.83	25.9	42.20	55.61
27.7	91.79	36.85	27.7	50.76	33.39	27.7	37.94	53.78	27.8	26.31	40.54	26.9	42.21	55.20
28.7	93.15	37.00	28.7	50.96	33.39	28.7	38.18	53.69	28.8	27.00	40.28	27.9	42.27	54.78
29.7	94.45	37.16	29.7	51.16	33.42	29.7	38.41	53.62	29.8	27.71	40.04	28.9	42.38	54.36
30.6	95.67	37.34	30.7	51.35	33.46	30.7	38.63	53.57	30.8	28.42	39.82	29.9	42.55	53.96
31.6	96.78	37.52	31.7	51.52	33.52	31.7	38.84	53.54	31.8	29.09	39.63	30.9	42.73	53.57
32.6	97.81	37.69	32.7	51.69	33.58	32.7	39.04	53.52	32.8	29.71	39.46	31.9	42.91	53.22
	51.78	+51.77		6.93	+6.86		8.20	+8.14		31.47	+31.45		23.55	+23.53
8h 10m 44s.772			9h 24m 37s.695			10h 20m 26s.885			12h 14m 26s.635			15h 5m 18s.999		
+88° 53′ 55″.27			+81° 42′ 59″.81			+83° 0′ 25″.01			+88° 11′ 15″.83			+87° 34′ 19″.83		

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

Groombridge 1119. Mag. 7.0			**1 H. Draconis.** Mag. 4.6			**30 H. Camelop.** Mag. 5.3			**Bradley 1672.** Mag. 6.3			**Groombridge 2283.** Mag. 7.2		
Mean Solar Date.	**Right Ascension.**	**Declination *North*.**	**Mean Solar Date.**	**Right Ascension.**	**Declination *North*.**	**Mean Solar Date.**	**Right Ascension.**	**Declination *North*.**	**Mean Solar Date.**	**Right Ascension.**	**Declination *North*.**	**Mean Solar Date.**	**Right Ascension.**	**Declination *North*.**
	h m	° ′		h m	° ′		h m	° ′		h m	° ′		h m	° ′
Dec.	8 12	+88 53	Dec.	9 24	+81 42	Dec.	10 20	+82 59	Dec.	12 14	+88 10	Dec.	15 4	+87 33
	s	″		s	″		s	″		s	″		s	″
1.6	36.78	37.52	1.7	51.52	33.52	1.7	38.84	53.54	1.8	29.09	39.63	1.9	42.91	53.22
2.6	37.81	37.69	2.7	51.69	33.58	2.7	39.04	53.52	2.8	29.71	39.46	2.9	43.08	52.90
3.6	38.79	37.85	3.7	51.85	33.62	3.7	39.23	53.48	3.8	30.30	39.28	3.9	43.22	52.60
4.6	39.77	37.99	4.7	52.00	33.65	4.7	39.40	53.43	4.8	30.85	39.09	4.9	43.33	52.30
5.6	40.78	38.11	5.7	52.16	33.65	5.7	39.58	53.37	5.8	31.38	38.89	5.9	43.42	51.98
6.6	41.83	38.23	6.7	52.32	33.65	6.7	39.77	53.29	6.8	31.91	38.69	6.9	43.50	51.65
7.6	42.93	38.35	7.7	52.48	33.65	7.7	39.96	53.22	7.8	32.48	38.48	7.9	43.59	51.30
8.6	44.07	38.48	8.7	52.65	33.66	8.7	40.16	53.16	8.8	33.09	38.25	8.9	43.71	50.94
9.6	45.24	38.63	9.7	52.83	33.69	9.7	40.37	53.10	9.8	33.75	38.03	9.9	43.86	50.57
10.6	46.41	38.81	10.7	53.01	33.74	10.7	40.59	53.06	10.8	34.45	37.83	10.9	44.05	50.20
11.6	47.57	39.01	11.7	53.20	33.81	11.7	40.82	53.04	11.8	35.19	37.65	11.9	44.27	49.82
12.6	48.68	39.23	12.7	53.39	33.90	12.7	41.05	53.04	12.8	35.94	37.48	12.9	44.53	49.45
13.6	49.74	39.46	13.7	53.57	34.01	13.7	41.27	53.07	13.8	36.70	37.33	13.9	44.81	49.10
14.6	50.73	39.71	14.7	53.75	34.14	14.7	41.48	53.12	14.8	37.45	37.21	14.9	45.10	48.77
15.6	51.65	39.96	15.7	53.92	34.28	15.7	41.69	53.17	15.8	38.18	37.11	15.9	45.40	48.46
16.6	52.52	40.20	16.7	54.07	34.41	16.7	41.89	53.23	16.8	38.88	37.02	16.9	45.69	48.16
17.6	53.33	40.43	17.7	54.21	34.53	17.7	42.08	53.28	17.8	39.55	36.93	17.9	45.97	47.88
18.6	54.11	40.64	18.6	54.35	34.65	18.7	42.26	53.33	18.8	40.19	36.84	18.9	46.23	47.61
19.6	54.88	40.84	19.6	54.49	34.75	19.7	42.43	53.36	19.8	40.79	36.74	19.9	46.47	47.35
20.6	55.69	41.03	20.6	54.64	34.83	20.7	42.61	53.37	20.8	41.38	36.62	20.9	46.68	47.08
21.6	56.56	41.21	21.6	54.79	34.90	21.7	42.79	53.38	21.8	41.98	36.49	21.9	46.87	46.78
22.6	57.49	41.40	22.6	54.95	34.98	22.7	42.98	53.38	22.8	42.62	36.36	22.9	47.08	46.47
23.6	58.48	41.60	23.6	55.11	35.07	23.7	43.18	53.39	23.8	43.31	36.22	23.9	47.32	46.14
24.6	59.49	41.83	24.6	55.27	35.18	24.7	43.39	53.42	24.8	44.06	36.08	24.9	47.60	45.80
25.6	60.48	42.09	25.6	55.44	35.32	25.7	43.61	53.48	25.7	44.86	35.96	25.9	47.93	45.46
26.6	61.42	42.37	26.6	55.61	35.48	26.7	43.83	53.57	26.7	45.68	35.87	26.9	48.29	45.13
27.6	62.27	42.67	27.6	55.78	35.68	27.7	44.04	53.69	27.7	46.50	35.81	27.9	48.69	44.82
28.6	63.02	42.98	28.6	55.94	35.88	28.7	44.23	53.82	28.7	47.29	35.78	28.9	49.11	44.55
29.6	63.68	43.28	29.6	56.08	36.08	29.7	44.41	53.96	29.7	48.03	35.77	29.9	49.52	44.30
30.6	64.25	43.56	30.6	56.20	36.28	30.7	44.58	54.09	30.7	48.72	35.76	30.9	49.91	44.07
31.6	64.79	43.82	31.6	56.31	36.47	31.7	44.74	54.21	31.7	49.37	35.75	31.8	50.26	43.85
32.6	65.35	44.07	32.6	56.42	36.64	32.6	44.90	54.32	32.7	49.99	35.74	32.8	50.58	43.64
	51.83	+51.82		6.93	+6.86		8.20	+8.14		31.43	+31.42		23.52	+23.50
$8^h\ 10^m\ 44^s.772$			$9^h\ 24^m\ 37^s.695$			$10^h\ 20^m\ 26^s.885$			$12^h\ 14^m\ 26^s.635$			$15^h\ 5^m\ 18^s.999$		
+88° 53′ 55″.27			+81° 42′ 59″.81			+83° 0′ 25″.01			+88° 11′ 15″.83			+87° 34′ 19″.83		

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

ε Ursæ Minoris. Mag. 4.4			**δ Ursæ Minoris.** Mag. 4.4			**λ Ursæ Minoris.** Mag. 6.6			**76 Draconis.** Mag. 5.7			**39 H. Cephei.** Mag. 5.6		
Mean Solar Date.	Right Ascension.	Declination *North*.	Mean Solar Date.	Right Ascension.	Declination *North*.	Mean Solar Date.	Right Ascension.	Declination *North*.	Mean Solar Date.	Right Ascension.	Declination *North*.	Mean Solar Date.	Right Ascension.	Declination *North*.
	h m	° ′		h m	° ′		h m	° ′		h m	° ′		h m	° ′
Jan.	16 54	+82 10	Jan.	18 0	+86 36	Jan.	19 7	+89 0	Jan.	20 48	+82 12	Jan.	23 27	+86 49
	s	″		s	″		s	″		s	″		s	″
0.9	49.72	45.65	0.9	18.93	40.17	1.0	21.11	28.50	1.1	51.01	25.64	1.2	29.11	34.93
1.9	49.76	45.33	1.9	18.89	39.85	2.0	20.59	28.21	2.1	50.90	25.43	2.2	28.75	34.94
2.9	49.79	45.00	2.9	18.85	39.52	3.0	20.00	27.92	3.1	50.78	25.22	3.2	28.35	34.94
3.9	49.82	44.64	3.9	18.82	39.16	4.0	19.43	27.61	4.1	50.65	24.97	4.2	27.94	34.94
4.9	49.87	44.26	4.9	18.78	38.79	5.0	18.89	27.27	5.1	50.54	24.71	5.2	27.50	34.91
5.9	49.92	43.87	5.9	18.77	38.39	6.0	18.44	26.91	6.1	50.42	24.40	6.2	27.05	34.85
6.9	50.00	43.48	6.9	18.79	37.99	7.0	18.10	26.53	7.1	50.31	24.08	7.2	26.61	34.77
7.9	50.09	43.11	7.9	18.86	37.60	7.9	17.88	26.15	8.1	50.22	23.75	8.2	26.19	34.66
8.9	50.18	42.78	8.9	18.95	37.24	8.9	17.75	25.78	9.1	50.13	23.43	9.2	25.79	34.53
9.9	50.27	42.47	9.9	19.06	36.89	9.9	17.69	25.43	10.1	50.07	23.11	10.2	25.42	34.39
10.9	50.36	42.18	10.9	19.17	36.57	10.9	17.68	25.10	11.1	50.01	22.82	11.2	25.08	34.25
11.9	50.45	41.90	11.9	19.27	36.28	11.9	17.66	24.80	12.1	49.95	22.54	12.2	24.77	34.12
12.9	50.54	41.63	12.9	19.35	36.00	12.9	17.61	24.50	13.1	49.90	22.27	13.2	24.46	34.00
13.9	50.62	41.37	13.9	19.43	35.71	13.9	17.54	24.22	14.1	49.85	22.00	14.2	24.14	33.89
14.9	50.70	41.09	14.9	19.51	35.41	14.9	17.43	23.92	15.1	49.78	21.74	15.2	23.81	33.80
15.9	50.78	40.80	15.9	19.59	35.10	15.9	17.30	23.62	16.0	49.70	21.46	16.2	23.47	33.70
16.9	50.86	40.50	16.9	19.66	34.79	16.9	17.15	23.30	17.0	49.64	21.17	17.2	23.11	33.59
17.9	50.95	40.19	17.9	19.74	34.45	17.9	17.02	22.96	18.0	49.56	20.87	18.2	22.73	33.48
18.9	51.04	39.88	18.9	19.83	34.10	18.9	16.93	22.63	19.0	49.48	20.55	19.1	22.35	33.35
19.9	51.14	39.55	19.9	19.95	33.74	19.9	16.90	22.27	20.0	49.41	20.21	20.1	21.96	33.19
20.9	51.25	39.22	20.9	20.09	33.38	20.9	16.95	21.90	21.0	49.35	19.86	21.1	21.56	33.01
21.9	51.38	38.90	21.9	20.26	33.03	21.9	17.07	21.52	22.0	49.30	19.49	22.1	21.18	32.81
22.9	51.51	38.61	22.9	20.44	32.69	22.9	17.29	21.15	23.0	49.26	19.13	23.1	20.84	32.60
23.9	51.64	38.33	23.9	20.64	32.37	23.9	17.59	20.79	24.0	49.24	18.77	24.1	20.51	32.37
24.9	51.76	38.09	24.9	20.85	32.08	24.9	17.93	20.46	25.0	49.22	18.43	25.1	20.22	32.16
25.9	51.89	37.88	25.9	21.05	31.81	25.9	18.28	20.16	26.0	49.20	18.12	26.1	19.95	31.94
26.9	52.02	37.68	26.9	21.25	31.56	26.9	18.62	19.86	27.0	49.19	17.82	27.1	19.71	31.75
27.9	52.13	37.48	27.9	21.42	31.32	27.9	18.90	19.59	28.0	49.18	17.53	28.1	19.45	31.57
28.9	52.23	37.27	28.9	21.57	31.07	28.9	19.10	19.33	29.0	49.15	17.26	29.1	19.19	31.41
29.8	52.33	37.04	29.9	21.71	30.81	29.9	19.25	19.04	30.0	49.11	16.98	30.1	18.92	31.25
30.8	52.43	36.79	30.9	21.85	30.54	30.9	19.37	18.75	31.0	49.07	16.68	31.1	18.62	31.09
31.8	52.54	36.54	31.9	22.00	30.24	31.9	19.50	18.43	32.0	49.02	16.37	32.1	18.29	30.92
32.8	52.66	36.27	32.9	22.17	29.92	32.9	19.69	18.09	33.0	48.97	16.02	33.1	17.94	30.72
	7.35	+7.28		16.91	+16.88		57.67	+57.66		7.37	+7.31		18.06	+18.03
16^{h}	54^{m}	$56^{s}.786$	18^{h}	0^{m}	$38^{s}.79$	19^{h}	8^{m}	$36^{s}.99$	20^{h}	49^{m}	$1^{s}.268$	23^{h}	27^{m}	$45^{s}.399$
+82°	11′	0″.93	+86°	36′	51″.01	+89°	0′	33″.82	+82°	12′	22″.39	+86°	49′	19″.56

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

ε Ursæ Minoris. Mag. 4.4			**δ Ursæ Minoris.** Mag. 4.4			**λ Ursæ Minoris.** Mag. 6.6			**76 Draconis.** Mag. 5.7			**39 H. Cephei.** Mag. 5.6		
Mean Solar Date.	**Right Ascension.**	**Declination** ***North.***	**Mean Solar Date.**	**Right Ascension.**	**Declination** ***North.***	**Mean Solar Date.**	**Right Ascension.**	**Declination** ***North.***	**Mean Solar Date.**	**Right Ascension.**	**Declination** ***North.***	**Mean Solar Date.**	**Right Ascension.**	**Declination** ***North.***
	h m	° ′		h m	° ′		h m	° ′		h m	° ′		h m	° ′
Feb.	16 54	+82 10	Feb.	18 0	+86 36	Feb.	19 7	+89 0	Feb.	20 48	+82 12	Feb.	23 27	+86 49
	s	″		s	″		s	″		s	″		s	″
1.8	52.66	36.27	1.9	22.17	29.92	1.9	19.69	18.09	1.0	49.02	16.37	1.1	18.29	30.92
2.8	52.79	35.99	2.9	22.37	29.59	2.9	19.99	17.73	2.0	48.97	16.02	2.1	17.94	30.72
3.8	52.93	35.73	3.9	22.60	29.27	3.9	20.39	17.38	2.9	48.94	15.65	3.1	17.61	30.49
4.8	53.09	35.50	4.9	22.87	28.98	4.9	20.90	17.03	3.9	48.93	15.27	4.1	17.29	30.24
5.8	53.25	35.30	5.9	23.15	28.71	5.9	21.49	16.70	4.9	48.93	14.89	5.1	17.00	29.96
6.8	53.40	35.12	6.9	23.44	28.47	6.9	22.13	16.40	5.9	48.95	14.53	6.1	16.74	29.68
7.8	53.55	34.97	7.9	23.72	28.25	7.9	22.78	16.12	6.9	48.97	14.18	7.1	16.51	29.41
8.8	53.70	34.83	8.9	23.98	28.04	8.9	23.42	15.86	7.9	49.00	13.85	8.1	16.32	29.14
9.8	53.85	34.70	9.9	24.24	27.84	9.9	24.02	15.61	8.9	49.03	13.54	9.1	16.13	28.88
10.8	53.97	34.57	10.9	24.49	27.64	10.9	24.58	15.36	9.9	49.06	13.24	10.1	15.95	28.63
11.8	54.10	34.42	11.9	24.73	27.44	11.9	25.10	15.12	10.9	49.07	12.95	11.1	15.77	28.40
12.8	54.24	34.27	12.9	24.96	27.23	12.9	25.62	14.87	11.9	49.09	12.66	12.1	15.57	28.17
13.8	54.38	34.10	13.9	25.20	27.00	13.9	26.14	14.60	12.9	49.10	12.36	13.1	15.37	27.93
14.8	54.52	33.92	14.9	25.46	26.76	14.9	26.69	14.32	13.9	49.11	12.05	14.1	15.14	27.68
15.8	54.67	33.75	15.8	25.73	26.51	15.9	27.28	14.02	14.9	49.12	11.72	15.1	14.90	27.43
16.8	54.82	33.58	16.8	26.01	26.26	16.9	27.93	13.72	15.9	49.13	11.37	16.1	14.66	27.16
17.8	54.99	33.41	17.8	26.32	26.01	17.9	28.66	13.42	16.9	49.14	11.03	17.1	14.42	26.87
18.8	55.16	33.27	18.8	26.64	25.78	18.9	29.46	13.12	17.9	49.18	10.67	18.1	14.19	26.57
19.8	55.34	33.15	19.8	26.99	25.57	19.9	30.33	12.83	18.9	49.22	10.31	19.1	13.99	26.25
20.8	55.52	33.07	20.8	27.34	25.39	20.9	31.26	12.56	19.9	49.27	9.95	20.1	13.82	25.92
21.8	55.68	33.00	21.8	27.69	25.23	21.9	32.22	12.33	20.9	49.33	9.61	21.1	13.67	25.59
22.8	55.85	32.95	22.8	28.03	25.11	22.9	33.18	12.12	21.9	49.40	9.29	22.1	13.56	25.27
23.8	56.00	32.91	23.8	28.34	24.99	23.9	34.09	11.93	22.9	49.48	9.00	23.1	13.48	24.96
24.8	56.14	32.87	24.8	28.64	24.87	24.9	34.91	11.74	23.9	49.55	8.73	24.0	13.41	24.67
25.8	56.28	32.81	25.8	28.91	24.75	25.9	35.66	11.56	24.9	49.61	8.46	25.0	13.33	24.40
26.8	56.42	32.74	26.8	29.18	24.61	26.9	36.36	11.37	25.9	49.67	8.20	26.0	13.23	24.15
27.8	56.56	32.66	27.8	29.45	24.46	27.9	37.05	11.17	26.9	49.71	7.94	27.0	13.11	23.91
28.8	56.71	32.57	28.8	29.73	24.29	28.9	37.77	10.94	27.9	49.76	7.67	28.0	12.97	23.66
29.8	56.86	32.46	29.8	30.04	24.11	29.9	38.57	10.69	28.9	49.80	7.37	29.0	12.81	23.38
30.8	57.03	32.37	30.8	30.38	23.93	30.9	39.45	10.43	29.9	49.85	7.05	30.0	12.65	23.08
	7.35	+7.28		16.90	+16.87		57.51	+57.51		7.37	+7.30		18.05	+18.02
$16^{h}\ 54^{m}\ 56^{s}.786$			$18^{h}\ 0^{m}\ 38^{s}.79$			$19^{h}\ 8^{m}\ 36^{s}.99$			$20^{h}\ 49^{m}\ 1^{s}.268$			$23^{h}\ 27^{m}\ 45^{s}.399$		
$+82^{\circ}\ 11'\ 0''.93$			$+86^{\circ}\ 36'\ 51''.01$			$+89^{\circ}\ 0'\ 33''.82$			$+82^{\circ}\ 12'\ 22''.39$			$+86^{\circ}\ 49'\ 19''.56$		

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

ε Ursæ Minoris. Mag. 4.4			**δ Ursæ Minoris.** Mag. 4.4			**λ Ursæ Minoris.** Mag. 6.6			**76 Draconis.** Mag. 5.7			**39 H. Cephei.** Mag. 5.6		
Mean Solar Date.	**Right Ascension.**	**Declination *North*.**	**Mean Solar Date.**	**Right Ascension.**	**Declination *North*.**	**Mean Solar Date.**	**Right Ascension.**	**Declination *North*.**	**Mean Solar Date.**	**Right Ascension.**	**Declination *North*.**	**Mean Solar Date.**	**Right Ascension.**	**Declination *North*.**
	h m	° ′		h m	° ′		h m	° ′		h m	° ′		h m	° ′
Mar.	16 54	+82 10	Mar.	18 0	+86 36	Mar.	19 7	+89 0	Mar.	20 48	+82 11	Mar.	23 27	+86 49
	s	″		s	″		s	″		s	″		s	″
1.8	57.03	32.37	1.8	30.38	23.93	1.9	39.45	10.43	1.9	49.92	66.72	1.0	12.65	23.08
2.8	57.21	32.30	2.8	30.75	23.76	2.9	40.44	10.18	2.9	49.99	66.39	2.0	12.50	22.75
3.8	57.39	32.26	3.8	31.13	23.63	3.8	41.52	9.96	3.9	50.08	66.07	3.0	12.38	22.40
4.8	57.57	32.26	4.8	31.52	23.52	4.8	42.66	9.76	4.9	50.18	65.76	4.0	12.30	22.05
5.8	57.74	32.27	5.8	31.90	23.45	5.8	43.81	9.59	5.9	50.28	65.49	5.0	12.26	21.71
6.7	57.90	32.31	6.8	32.26	23.41	6.8	44.94	9.44	6.9	50.39	65.24	6.0	12.26	21.38
7.7	58.06	32.34	7.8	32.62	23.38	7.8	46.03	9.32	7.9	50.49	65.00	7.0	12.27	21.06
8.7	58.21	32.39	8.8	32.95	23.34	8.8	47.07	9.20	8.9	50.59	64.78	8.0	12.28	20.75
9.7	58.36	32.42	9.8	33.27	23.29	9.8	48.06	9.07	9.9	50.68	64.56	9.0	12.30	20.46
10.7	58.51	32.45	10.8	33.60	23.24	10.8	49.02	8.95	10.9	50.77	64.34	10.0	12.30	20.17
11.7	58.66	32.47	11.8	33.92	23.17	11.8	49.97	8.82	11.9	50.85	64.11	11.0	12.28	19.88
12.7	58.80	32.47	12.8	34.25	23.10	12.8	50.93	8.67	12.9	50.93	63.86	12.0	12.26	19.59
13.7	58.96	32.47	13.8	34.58	23.02	13.8	51.93	8.52	13.9	51.02	63.60	13.0	12.23	19.30
14.7	59.12	32.48	14.8	34.93	22.94	14.8	52.96	8.36	14.9	51.11	63.34	13.9	12.20	18.99
15.7	59.28	32.49	15.8	35.29	22.86	15.8	54.04	8.20	15.9	51.22	63.06	14.9	12.16	18.68
16.7	59.45	32.52	16.8	35.67	22.79	16.8	55.19	8.04	16.9	51.33	62.78	15.9	12.13	18.35
17.7	59.63	32.57	17.8	36.07	22.75	17.8	56.42	7.88	17.9	51.45	62.52	16.9	12.12	18.01
18.7	59.80	32.65	18.8	36.48	22.73	18.8	57.69	7.75	18.9	51.58	62.27	17.9	12.13	17.67
19.7	59.98	32.76	19.8	36.88	22.73	19.8	58.99	7.65	19.9	51.72	62.05	18.9	12.17	17.31
20.7	60.15	32.88	20.8	37.27	22.76	20.8	60.28	7.58	20.9	51.86	61.84	19.9	12.26	16.96
21.7	60.30	33.02	21.8	37.65	22.81	21.8	61.53	7.54	21.9	51.99	61.67	20.9	12.37	16.63
22.7	60.44	33.16	22.8	37.99	22.87	22.8	62.71	7.51	22.9	52.13	61.53	21.9	12.49	16.32
23.7	60.56	33.28	23.7	38.30	22.93	23.8	63.80	7.48	23.9	52.26	61.39	22.9	12.62	16.03
24.7	60.69	33.40	24.7	38.61	22.98	24.8	64.80	7.45	24.9	52.37	61.24	23.9	12.74	15.77
25.7	60.82	33.49	25.7	38.91	23.00	25.8	65.76	7.40	25.9	52.48	61.08	24.9	12.84	15.51
26.7	60.95	33.58	26.7	39.22	23.01	26.8	66.74	7.33	26.9	52.59	60.91	25.9	12.93	15.27
27.7	61.08	33.65	27.7	39.54	23.00	27.8	67.77	7.24	27.9	52.70	60.72	26.9	12.98	15.01
28.7	61.23	33.73	28.7	39.88	23.00	28.8	68.87	7.15	28.9	52.82	60.52	27.9	13.02	14.74
29.7	61.38	33.82	29.7	40.25	23.01	29.8	70.08	7.06	29.8	52.94	60.31	28.9	13.08	14.45
30.7	61.54	33.94	30.7	40.63	23.03	30.8	71.36	6.99	30.8	53.07	60.12	29.9	13.15	14.13
31.7	61.70	34.10	31.7	41.02	23.09	31.8	72.68	6.94	31.8	53.22	59.94	30.9	13.25	13.79
32.7	61.86	34.29	32.7	41.41	23.18	32.8	74.02	6.91	32.8	53.39	59.79	31.9	13.40	13.46
	7.35	+7.28		16.89	+16.86		57.44	+57.43		7.37	+7.30		18.04	+18.01
$+16^h\ 54^m\ 56^s.786$			$18^h\ 0^m\ 38^s.79$			$19^h\ 8^m\ 36^s.99$			$20^h\ 49^m\ 1^s.268$			$23^h\ 27^m\ 45^s.399$		
+82° 11′ 0″.93			+86° 36′ 51″.01			+89° 0′ 33″.82			+82° 12′ 22″.39			+86° 49′ 19″.56		

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

ε Ursæ Minoris. Mag. 4.4			**δ Ursæ Minoris.** Mag. 4.4			**λ Ursæ Minoris.** Mag. 6.6			**76 Draconis.** Mag. 5.7			**30 H. Cephei.** Mag. 5.6		
Mean Solar Date.	Right Ascension.	Declination *North.*	Mean Solar Date.	Right Ascension.	Declination *North.*	Mean Solar Date.	Right Ascension.	Declination *North.*	Mean Solar Date.	Right Ascension.	Declination *North.*	Mean Solar Date.	Right Ascension.	Declination *North.*
	h m	° ′		h m	° ′		h m	° ′		h m	° ′		h m	° ′
Apr.	16 55	+82 10	Apr.	18 0	+86 36	Apr.	19 8	+89 0	Apr.	20 48	+82 11	Apr.	23 27	+86 49
	s	″		s	″		s	″		s	″		s	″
1.7	1.86	34.29	1.7	41.41	23.18	1.8	14.02	6.91	1.8	53.39	59.79	1.9	13.58	13.15
2.7	2.01	34.49	2.7	41.78	23.30	2.8	15.33	6.92	2.8	53.55	59.65	2.9	13.78	12.85
3.7	2.14	34.69	3.7	42.13	23.42	3.8	16.60	6.95	3.8	53.71	59.55	3.9	14.00	12.57
4.7	2.27	34.90	4.7	42.46	23.55	4.8	17.82	7.00	4.8	53.85	59.47	4.9	14.21	12.32
5.7	2.39	35.11	5.7	42.78	23.68	5.8	18.97	7.04	5.8	54.00	59.39	5.9	14.42	12.07
6.7	2.50	35.31	6.7	43.09	23.81	6.8	20.07	7.08	6.8	54.15	59.32	6.9	14.61	11.84
7.7	2.61	35.50	7.7	43.39	23.93	7.8	21.13	7.12	7.8	54.29	59.24	7.9	14.79	11.60
8.7	2.73	35.67	8.7	43.68	24.03	8.7	22.18	7.15	8.8	54.43	59.14	8.9	14.96	11.36
9.7	2.84	35.83	9.7	43.98	24.12	9.7	23.24	7.16	9.8	54.56	59.04	9.9	15.11	11.12
10.7	2.96	36.00	10.7	44.30	24.20	10.7	24.33	7.16	10.8	54.69	58.93	10.9	15.26	10.87
11.6	3.09	36.17	11.7	44.63	24.29	11.7	25.47	7.17	11.8	54.83	58.81	11.9	15.42	10.61
12.6	3.22	36.35	12.7	44.96	24.39	12.7	26.65	7.18	12.8	54.97	58.69	12.9	15.58	10.33
13.6	3.36	36.54	13.7	45.31	24.50	13.7	27.89	7.20	13.8	55.12	58.57	13.9	15.78	10.05
14.6	3.50	36.74	14.7	45.66	24.63	14.7	29.17	7.23	14.8	55.28	58.47	14.9	16.00	9.77
15.6	3.63	36.98	15.7	46.01	24.79	15.7	30.48	7.28	15.8	55.46	58.40	15.9	16.26	9.49
16.6	3.75	37.25	16.7	46.35	24.96	16.7	31.76	7.37	16.8	55.64	58.35	16.9	16.54	9.23
17.6	3.86	37.52	17.7	46.67	25.16	17.7	33.01	7.48	17.8	55.81	58.32	17.9	16.83	8.99
18.6	3.96	37.80	18.7	46.97	25.38	18.7	34.19	7.62	18.8	55.97	58.32	18.9	17.15	8.78
19.6	4.05	38.07	19.7	47.23	25.61	19.7	35.27	7.77	19.8	56.13	58.34	19.9	17.45	8.59
20.6	4.12	38.34	20.7	47.47	25.82	20.7	36.25	7.91	20.8	56.28	58.37	20.9	17.73	8.44
21.6	4.20	38.59	21.7	47.69	26.01	21.7	37.16	8.04	21.8	56.42	58.39	21.9	17.99	8.28
22.6	4.27	38.81	22.7	47.91	26.18	22.7	38.06	8.14	22.8	56.55	58.39	22.9	18.22	8.12
23.6	4.35	39.01	23.7	48.15	26.33	23.7	38.97	8.22	23.8	56.68	58.38	23.9	18.44	7.94
24.6	4.44	39.22	24.7	48.41	26.47	24.7	39.95	8.30	24.8	56.81	58.35	24.9	18.65	7.74
25.6	4.54	39.44	25.7	48.70	26.62	25.7	40.99	8.37	25.8	56.96	58.31	25.9	18.88	7.53
26.6	4.65	39.68	26.7	49.00	26.79	26.7	42.11	8.45	26.8	57.12	58.27	26.9	19.12	7.30
27.6	4.75	39.94	27.7	49.30	26.99	27.7	43.28	8.55	27.8	57.28	58.25	27.9	19.42	7.07
28.6	4.85	40.23	28.6	49.60	27.22	28.7	44.48	8.67	28.8	57.46	58.25	28.9	19.74	6.86
29.6	4.95	40.54	29.6	49.89	27.47	29.7	45.65	8.84	29.8	57.64	58.28	29.9	20.09	6.66
30.6	5.03	40.86	30.6	50.15	27.74	30.7	46.79	9.02	30.8	57.82	58.34	30.9	20.46	6.48
31.6	5.10	41.19	31.6	50.39	28.01	31.7	47.84	9.22	31.8	58.00	58.42	31.9	20.82	6.33
32.6	5.15	41.51	32.6	50.61	28.29	32.7	48.82	9.42	32.8	58.17	58.51	32.9	21.18	6.19
	7.35	+7.28		16.90	+16.87		57.41	+57.41		7.37	+7.30		18.02	+18.00
16^h	54^m	$56^s.786$	18^h	0^m	$38^s.79$	19^h	8^m	$36^s.99$	20^h	49^m	$1^s.268$	23^h	27^m	$45^s.399$
+82°	11′	0″.93	+86°	36′	51″.01	+89°	0′	33″.82	+82°	12′	22″.39	+86°	49′	19″.56

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

ε Ursæ Minoris. Mag. 4.4			**δ Ursæ Minoris.** Mag. 4.4			**λ Ursæ Minoris.** Mag. 6.6			**76 Draconis.** Mag. 5.7			**39 H. Cephei.** Mag. 5.6		
Mean Solar Date.	**Right Ascension.**	**Declination** *North.*	**Mean Solar Date.**	**Right Ascension.**	**Declination** *North.*	**Mean Solar Date.**	**Right Ascension.**	**Declination** *North.*	**Mean Solar Date.**	**Right Ascension.**	**Declination** *North.*	**Mean Solar Date.**	**Right Ascension.**	**Declination** *North.*
	h m	° ′		h m	° ′		h m	° ′		h m	° ′		h m	° ′
May	16 55	+82 10	May	18 0	+86 36	May	19 8	+89 0	May	20 48	+82 11	May	23 27	+86 49
	s	″		s	″		s	″		s	″		s	″
1.6	5.10	41.19	1.6	50.39	28.01	1.7	47.84	9.22	1.8	58.00	58.42	1.9	20.82	6.33
2.6	5.15	41.51	2.6	50.61	28.29	2.7	48.82	9.42	2.8	58.17	58.51	2.9	21.18	6.19
3.6	5.21	41.82	3.6	50.81	28.55	3.7	49.73	9.63	3.8	58.32	58.60	3.9	21.52	6.07
4.6	5.26	42.11	4.6	50.99	28.81	4.7	50.59	9.83	4.7	58.47	58.69	4.9	21.84	5.96
5.6	5.30	42.39	5.6	51.17	29.04	5.7	51.43	10.01	5.7	58.61	58.77	5.9	22.14	5.85
6.6	5.35	42.65	6.6	51.35	29.27	6.7	52.25	10.19	6.7	58.75	58.84	6.9	22.44	5.73
7.6	5.41	42.90	7.6	51.55	29.49	7.7	53.09	10.36	7.7	58.89	58.91	7.8	22.73	5.60
8.6	5.48	43.16	8.6	51.75	29.71	8.7	53.95	10.51	8.7	59.02	58.96	8.8	23.01	5.48
9.6	5.54	43.43	9.6	51.96	29.92	9.7	54.85	10.65	9.7	59.16	59.01	9.8	23.30	5.33
10.6	5.61	43.70	10.6	52.18	30.14	10.7	55.80	10.82	10.7	59.31	59.06	10.8	23.61	5.19
11.6	5.68	43.99	11.6	52.41	30.38	11.7	56.78	10.99	11.7	59.47	59.12	11.8	23.95	5.04
12.6	5.74	44.31	12.6	52.64	30.65	12.7	57.77	11.18	12.7	59.63	59.21	12.8	24.30	4.90
13.6	5.79	44.64	13.6	52.85	30.95	13.7	58.77	11.39	13.7	59.80	59.32	13.8	24.69	4.76
14.6	5.84	45.00	14.6	53.05	31.25	14.7	59.73	11.64	14.7	59.97	59.44	14.8	25.10	4.66
15.6	5.87	45.36	15.6	53.22	31.58	15.6	60.63	11.91	15.7	60.14	59.60	15.8	25.52	4.58
16.6	5.88	45.71	16.6	53.35	31.91	16.6	61.41	12.17	16.7	60.30	59.79	16.8	25.94	4.52
17.6	5.89	46.05	17.6	53.46	32.23	17.6	62.08	12.46	17.7	60.45	59.99	17.8	26.33	4.50
18.5	5.90	46.36	18.6	53.55	32.53	18.6	62.66	12.72	18.7	60.59	60.17	18.8	26.69	4.48
19.5	5.90	46.66	19.6	53.63	32.81	19.6	63.20	12.97	19.7	60.71	60.35	19.8	27.03	4.47
20.5	5.91	46.93	20.6	53.71	33.06	20.6	63.74	13.19	20.7	60.82	60.50	20.8	27.34	4.44
21.5	5.92	47.19	21.6	53.80	33.30	21.6	64.31	13.40	21.7	60.94	60.63	21.8	27.65	4.40
22.5	5.94	47.45	22.6	53.92	33.54	22.6	64.93	13.60	22.7	61.07	60.76	22.8	27.96	4.33
23.5	5.98	47.73	23.6	54.06	33.80	23.6	65.64	13.80	23.7	61.20	60.88	23.8	28.28	4.26
24.5	6.01	48.04	24.6	54.21	34.08	24.6	66.40	14.02	24.7	61.34	61.02	24.8	28.63	4.19
25.5	6.03	48.36	25.6	54.36	34.37	25.6	67.20	14.26	25.7	61.50	61.17	25.8	29.02	4.12
26.5	6.05	48.71	26.6	54.50	34.69	26.6	67.98	14.52	26.7	61.65	61.35	26.8	29.44	4.06
27.5	6.07	49.07	27.6	54.62	35.03	27.6	68.70	14.81	27.7	61.80	61.55	27.8	29.87	4.03
28.5	6.07	49.43	28.6	54.71	35.38	28.6	69.35	15.12	28.7	61.95	61.78	28.8	30.30	4.01
29.5	6.06	49.79	29.6	54.77	35.73	29.6	69.94	15.44	29.7	62.09	62.02	29.8	30.73	4.03
30.5	6.03	50.14	30.6	54.82	36.07	30.6	70.43	15.76	30.7	62.23	62.26	30.8	31.14	4.06
31.5	6.00	50.46	31.6	54.85	36.40	31.6	70.85	16.07	31.7	62.35	62.51	31.8	31.53	4.10
32.5	5.98	50.77	32.6	54.87	36.71	32.6	71.23	16.36	32.7	62.47	62.74	32.8	31.90	4.14
	7.35	+7.28		16.90	+16.88		57.49	+57.48		7.37	+7.30		18.02	+17.99
$16^h\ 54^m\ 56^s.786$			$18^h\ 0^m\ 38^s.79$			$19^h\ 8^m\ 36^s.99$			$20^h\ 49^m\ 1^s.268$			$23^h\ 27^m\ 45^s.399$		
+82° 11′ 0″.93			+86° 36′ 51″.01			+89° 0′ 33″.82			+82° 12′ 22″.39			+86° 49′ 19″.56		

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

ε Ursæ Minoris. Mag. 4.4			**δ Ursæ Minoris.** Mag. 4.4			**λ Ursæ Minoris.** Mag. 6.6			**76 Draconis.** Mag. 5.7			**39 H. Cephei.** Mag. 5 6		
Mean Solar Date.	**Right Ascension.**	**Declination** *North.*	**Mean Solar Date.**	**Right Ascension.**	**Declination** *North.*	**Mean Solar Date.**	**Right Ascension.**	**Declination** *North.*	**Mean Solar Date.**	**Right Ascension.**	**Declination** *North.*	**Mean Solar Date.**	**Right Ascension.**	**Declination** *North.*
	h m	° ′		h m	° ′		h m	° ′		h m	° ′		h m	° ′
June	16 55	+82 10	June	18 0	+86 36	June	19 9	+89 0	June	20 49	+82 12	June	23 27	+86 49
	s	″		s	″		s	″		s	″		s	″
1.5	5.98	50.77	1.6	54.87	36.71	1.6	11.23	16.36	1.7	2.47	2.74	1.8	31.90	4.14
2.5	5.96	51.06	2.6	54.89	37.01	2.6	11.60	16.65	2.7	2.58	2.97	2.8	32.25	4.19
3.5	5.93	51.34	3.5	54.91	37.29	3.6	11.96	16.92	3.7	2.68	3.19	3.8	32.59	4.22
4.5	5.91	51.61	4.5	54.94	37.57	4.6	12.32	17.17	4.7	2.78	3.38	4.8	32.93	4.25
5.5	5.90	51.89	5.5	54.98	37.84	5.6	12.72	17.42	5.7	2.89	3.57	5.8	33.26	4.27
6.5	5.89	52.18	6.5	55.03	38.12	6.6	13.17	17.65	6.7	3.01	3.77	6.8	33.59	4.28
7.5	5.88	52.49	7.5	55.09	38.41	7.6	13.65	17.91	7.7	3.13	3.97	7.8	33.95	4.29
8.5	5.87	52.81	8.5	55.15	38.71	8.6	14.15	18.18	8.7	3.26	4.19	8.8	34.33	4.30
9.5	5.85	53.14	9.5	55.20	39.04	9.6	14.66	18.48	9.6	3.38	4.42	9 8	34.75	4.32
10.5	5.82	53.49	10.5	55.23	39.39	10.6	15.14	18.80	10.6	3.52	4.67	10.8	35.17	4.37
11.5	5.78	53.84	11.5	55.25	39.75	11.6	15.54	19.15	11.6	3.65	4.96	11.8	35.61	4.43
12.5	5.73	54.19	12.5	55.22	40.12	12.6	15.84	19.51	12.6	3.77	5.28	12.8	36.05	4.53
13.5	5.67	54.52	13.5	55.17	40.49	13.6	16.02	19.87	13.6	3.88	5.60	13.7	36.47	4.65
14.5	5.59	54.84	14.5	55.09	40.85	14.6	16.11	20.22	14.6	3.96	5.92	14.7	36.87	4.79
15.5	5.52	55.13	15.5	54.99	41.17	15.6	16.12	20.56	15.6	4.05	6.23	15.7	37.22	4.93
16.5	5.45	55.40	16.5	54.89	41.47	16.6	16.09	20.87	16.6	4.12	6.53	16.7	37.55	5.08
17.5	5.39	55.65	17.5	54.80	41.74	17.6	16.10	21.15	17.6	4.18	6.80	17.7	37.86	5.21
18.5	5.33	55.90	18.5	54.73	42.01	18.6	16.15	21.42	18.6	4.25	7.05	18.7	38.17	5.32
19.5	5.28	56.16	19.5	54.69	42.27	19.6	16.27	21.69	19.6	4.33	7.29	19.7	38.48	5.41
20.5	5.24	56.43	20.5	54.66	42.56	20.6	16.46	21.96	20.6	4.42	7.53	20.7	38.82	5.50
21.5	5.19	56.72	21.5	54.64	42.87	21.5	16.69	22.25	21.6	4.52	7.80	21.7	39.19	5.58
22.5	5.14	57.03	22.5	54.61	43.21	22.5	16.93	22.56	22.6	4.62	8.08	22.7	39.59	5.67
23.4	5.08	57.36	23.5	54.56	43.55	23.5	17.12	22.90	23.6	4.73	8.39	23.7	40.00	5.78
24.4	5.01	57.69	24.5	54.49	43.91	24.5	17.26	23.26	24.6	4.83	8.73	24.7	40.41	5.91
25.4	4.93	58.02	25.5	54.38	44.26	25.5	17.31	23.62	25.6	4.92	9.08	25.7	40.83	6.07
26.4	4.83	58.33	26.5	54.26	44.62	26.5	17.28	23.99	26.6	5.01	9.42	26.7	41.23	6.26
27.4	4.73	58.62	27.5	54.12	44.96	27.5	17.15	24.36	27.6	5.08	9.77	27.7	41.60	6.46
28.4	4.64	58.90	28.5	53.97	45.28	28.5	16.97	24.70	28.6	5.14	10.12	28.7	41.95	6.66
29.4	4.53	59.15	29.5	53.81	45.58	29.5	16.76	25.04	29.6	5.19	10.45	29.7	42.27	6.85
30.4	4.44	59.39	30.5	53.66	45.87	30.5	16.55	25.35	30.6	5.23	10.77	30.7	42.58	7.04
31.4	4.35	59.62	31.5	53.51	46.13	31.5	16.33	25.65	31.6	5.28	11.08	31.7	42.89	7.22
	7.35	+7.28		16.92	+16.89		57.62	+57.62		7.37	+7.30		18.02	+17.99
$16^h\ 54^m\ 56^s.786$			$18^h\ 0^m\ 38^s.79$			$19^h\ 8^m\ 36^s.99$			$20^h\ 49^m\ 1^s.268$			$23^h\ 27^m\ 45^s.399$		
+82° 11′ 0″.93			+86° 36′ 51″.01			+89° 0′ 33″.82			+82° 12′ 22″.39			+86° 49′ 19″.56		

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

ε Ursæ Minoris. Mag. 4.4			**δ Ursæ Minoris.** Mag. 4.4			**λ Ursæ Minoris.** Mag. 6.6			**76 Draconis.** Mag. 5.7			**39 H. Cephei.** Mag. 5.6		
Mean Solar Date.	**Right Ascension.**	**Declination** *North.*	**Mean Solar Date.**	**Right Ascension.**	**Declination** *North.*	**Mean Solar Date.**	**Right Ascension.**	**Declination** *North.*	**Mean Solar Date.**	**Right Ascension.**	**Declination** *North.*	**Mean Solar Date.**	**Right Ascension.**	**Declination** *North.*
	h m	° ′		h m	° ′		h m	° ′		h m	° ′		h m	° ′
July	16 55	+82 10	July	18 0	+86 36	July	19 9	+89 0	July	20 49	+82 12	July	23 27	+86 49
	s	″		s	″		s	″		s	″		s	″
1.4	4.35	59.62	1.5	53.51	46.13	1.5	16.33	25.65	1.6	5.28	11.08	1.7	42.89	7.22
2.4	4.27	59.84	2.5	53.38	46.39	2.5	16.14	25.93	2.6	5.32	11.37	2.7	43.18	7.40
3.4	4.19	60.07	3.5	53.25	46.65	3.5	15.98	26.21	3.6	5.38	11.66	3.7	43.47	7.56
4.4	4.11	60.30	4.5	53.14	46.93	4.5	15.87	26.50	4.6	5.43	11.94	4.7	43.78	7.72
5.4	4.03	60.54	5.5	53.02	47.21	5.5	15.79	26.80	5.6	5.49	12.24	5.7	44.11	7.87
6.4	3.95	60.81	6.5	52.91	47.51	6.5	15.72	27.10	6.6	5.56	12.55	6.7	44.46	8.03
7.4	3.87	61.10	7.5	52.78	47.84	7.5	15.64	27.44	7.6	5.63	12.88	7.7	44.82	8.23
8.4	3.76	61.39	8.5	52.62	48.18	8.5	15.49	27.79	8.6	5.70	13.24	8.7	45.20	8.43
9.4	3.65	61.68	9.5	52.44	48.52	9.5	15.25	28.16	9.6	5.76	13.61	9.7	45.58	8.65
10.4	3.52	61.96	10.4	52.23	48.85	10.5	14.92	28.54	10.6	5.81	14.00	10.7	45.95	8.90
11.4	3.38	62.21	11.4	51.99	49.17	11.5	14.46	28.91	11.6	5.84	14.41	11.7	46.28	9.18
12.4	3.24	62.44	12.4	51.74	49.48	12.5	13.92	29.26	12.6	5.87	14.80	12.7	46.60	9.46
13.4	3.09	62.63	13.4	51.47	49.75	13.5	13.31	29.61	13.6	5.87	15.18	13.7	46.87	9.76
14.4	2.96	62.81	14.4	51.21	49.99	14.5	12.72	29.90	14.6	5.87	15.53	14.7	47.12	10.02
15.4	2.84	62.97	15.4	50.97	50.23	15.5	12.16	30.19	15.6	5.88	15.85	15.7	47.35	10.28
16.4	2.73	63.14	16.4	50.76	50.45	16.5	11.66	30.47	16.5	5.88	16.16	16.7	47.59	10.52
17.4	2.61	63.33	17.4	50.56	50.67	17.5	11.23	30.73	17.5	5.90	16.47	17.7	47.85	10.74
18.4	2.50	63.53	18.4	50.37	50.91	18.5	10.87	31.02	18.5	5.93	16.79	18.7	48.13	10.96
19.4	2.39	63.76	19.4	50.17	51.19	19.5	10.52	31.32	19.5	5.97	17.13	19.7	48.43	11.18
20.4	2.28	64.00	20.4	49.97	51.48	20.5	10.16	31.65	20.5	6.00	17.48	20.6	48.76	11.42
21.4	2.15	64.24	21.4	49.75	51.79	21.5	9.74	32.00	21.5	6.03	17.85	21.6	49.09	11.68
22.4	2.01	64.48	22.4	49.50	52.11	22.5	9.24	32.36	22.5	6.06	18.25	22.6	49.41	11.97
23.4	1.86	64.70	23.4	49.22	52.41	23.5	8.67	32.72	23.5	6.07	18.65	23.6	49.73	12.27
24.4	1.71	64.90	24.4	48.93	52.68	24.5	8.00	33.06	24.5	6.07	19.05	24.6	50.01	12.58
25.4	1.55	65.08	25.4	48.62	52.95	25.5	7.27	33.40	25.5	6.06	19.44	25.6	50.28	12.90
26.4	1.39	65.23	26.4	48.31	53.19	26.5	6.51	33.74	26.5	6.05	19.82	26.6	50.53	13.22
27.4	1.25	65.37	27.4	48.00	53.41	27.4	5.74	34.03	27.5	6.03	20.18	27.6	50.74	13.54
28.4	1.09	65.51	28.4	47.70	53.62	28.4	4.97	34.32	28.5	6.01	20.53	28.6	50.94	13.85
29.4	0.95	65.64	29.4	47.41	53.82	29.4	4.21	34.59	29.5	5.99	20.86	29.6	51.14	14.15
30.3	0.81	65.75	30.4	47.12	54.02	30.4	3.49	34.84	30.5	5.97	21.18	30.6	51.33	14.43
31.3	0.68	65.88	31.4	46.84	54.22	31.4	2.81	35.10	31.5	5.95	21.50	31.6	51.54	14.71
32.3	0.55	66.02	32.4	46.59	54.43	32.4	2.18	35.36	32.5	5.94	21.83	32.6	51.75	14.98
7.35		+7.29	16.93		+16.90	57.79		+57.79	7.37		+7.30	18.02		+18.00
$16^{h}\ 54^{m}\ 56^{s}.786$			$18^{h}\ 0^{m}\ 38^{s}.79$			$19^{h}\ 8^{m}\ 36^{s}.99$			$20^{h}\ 49^{m}\ 1^{s}.268$			$23^{h}\ 27^{m}\ 45''.399$		
+82° 11′ 0″.93			+86° 36′ 51″.01			+89° 0′ 33″.82			+82° 12′ 22″.39			+86° 49′ 19″.56		

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

ε Ursæ Minoris. Mag. 4.4			**δ Ursæ Minoris.** Mag. 4.4			**λ Ursæ Minoris.** Mag. 6.6			**76 Draconis.** Mag. 5.7			**39 H. Cephei.** Mag. 5.6		
Mean Solar Date.	**Right Ascension.**	**Declination *North*.**	**Mean Solar Date.**	**Right Ascension.**	**Declination *North*.**	**Mean Solar Date.**	**Right Ascension.**	**Declination *North*.**	**Mean Solar Date.**	**Right Ascension.**	**Declination *North*.**	**Mean Solar Date.**	**Right Ascension.**	**Declination *North*.**
	h m	° ′		h m	° ′		h m	° ′		h m	° ′		h m	° ′
Aug.	16 54	+82 11	Aug.	18 0	+86 36	Aug.	19 8	+89 0	Aug.	20 49	+82 12	Aug.	23 27	+86 49
	s	″		s	″		s	″		s	″		s	″
1.3	60.55	6.02	1.4	46.59	54.43	1.4	62.18	35.36	1.5	5.94	21.83	1.6	51.75	14.98
2.3	60.42	6.18	2.4	46.34	54.66	2.4	61.56	35.63	2.5	5.93	22.16	2.6	51.97	15.24
3.3	60.29	6.34	3.4	46.08	54.90	3.4	60.93	35.92	3.5	5.94	22.50	3.6	52.23	15.53
4.3	60.14	6.53	4.4	45.80	55.15	4.4	60.28	36.23	4.5	5.94	22.87	4.6	52.50	15.82
5.3	59.98	6.71	5.4	45.49	55.42	5.4	59.56	36.57	5.5	5.93	23 27	5.6	52.77	16.15
6.3	59.80	6.88	6.4	45.15	55.68	6.4	58.74	36.90	6.5	5.91	23.68	6.6	53.02	16.51
7.3	59.62	7.04	7.4	44.79	55.93	7.4	57.80	37.23	7.5	5.88	24.09	7.6	53.26	16.88
8.3	59.44	7.15	8.4	44.40	56.16	8.4	56.76	37.55	8.5	5.83	24.50	8.6	53.47	17.26
9.3	59.25	7.25	9.4	44.00	56.36	9.4	55.65	37.85	9.5	5.77	24.89	9.6	53.64	17.64
10.3	59.07	7.32	10.4	43.60	56.53	10.4	54.53	38.11	10.5	5.70	25.25	10.6	53.77	18.02
11.3	58.91	7.37	11.4	43.22	56.67	11.4	53.44	38.35	11.5	5.63	25.59	11.6	53.89	18.38
12.3	58.74	7.42	12.4	42.86	56.81	12.4	52.40	38.57	12.5	5.56	25.91	12.6	53.99	18.72
13.3	58.59	7.46	13.4	42.54	56.96	13.4	51.43	38.79	13.5	5.51	26.23	13.6	54.11	19.05
14.3	58.44	7.53	14.4	42.22	57.11	14.4	50.52	39.02	14.5	5.46	26.53	14.6	54.25	19.36
15.3	58.29	7.62	15.4	41.91	57.28	15.4	49.66	39.26	15.5	5.42	26.86	15.6	54.41	19.67
16.3	58.13	7.73	16.3	41.58	57.47	16.4	48.81	39.52	16.5	5.39	27.20	16.6	54.59	19.98
17.3	57.97	7.85	17.3	41.24	57.68	17.4	47.90	39.80	17.5	5.36	27.58	17.6	54.80	20.32
18.3	57.80	7.97	18.3	40.89	57.89	18.4	46.95	40.09	18.5	5.31	27.96	18.6	55.00	20.69
19.3	57.61	8.09	19.3	40.51	58.10	19.4	45.92	40.39	19.5	5.27	28.35	19.6	55.19	21.06
20.3	57.43	8.18	20.3	40.11	58.30	20.4	44.80	40.68	20.5	5.20	28.74	20.6	55.35	21.45
21.3	57.24	8.23	21.3	39.69	58.47	21.4	43.61	40.95	21.5	5.12	29.13	21.6	55.50	21.86
22.3	57.05	8.27	22.3	39.27	58.62	22.4	42.38	41.21	22.4	5.04	29.49	22.6	55.61	22.26
23.3	56.86	8.30	23.3	38.85	58.75	23.4	41.14	41.45	23.4	4.95	29.84	23.6	55.71	22.65
24.3	56.68	8.30	24.3	38.44	58.87	24.4	39.90	41.66	24.4	4.86	30.17	24.6	55.77	23.04
25.3	56.51	8.29	25.3	38.04	58.97	25.4	38.68	41.86	25.4	4.76	30.48	25.5	55.83	23.40
26.3	56.34	8.28	26.3	37.65	59.05	26.4	37.49	42.06	26.4	4.67	30.78	26.5	55.88	23.76
27.3	56.17	8.28	27.3	37.26	59.15	27.4	36.36	42.24	27.4	4.59	31.08	27.5	55.93	24.10
28.3	56.01	8.27	28.3	36.90	59.24	28.4	35.26	42.42	28.4	4.51	31.37	28.5	55.98	24.44
29.3	55.85	8.29	29.3	36.56	59.34	29.4	34.20	42.62	29.4	4.43	31.66	29.5	56.07	24.77
30.3	55.69	8.32	30.3	36.20	59.47	30.4	33 15	42.82	30.4	4.36	31.97	30.5	56.16	25.11
31.3	55.53	8.36	31.3	35.83	59.60	31.4	32.08	43.03	31.4	4.29	32.31	31.5	56.27	25.46
32.3	55.35	8.42	32.3	35.44	59.74	32.4	30.97	43.27	32.4	4.22	32.66	32.5	56.40	25.83
	7.35	+7.29		16.94	+16.91		57.94	+57.93		7.38	+7.31		18.04	+18.01
	16^{h} 54^{m}	$56^{s}.786$		18^{h} 0^{m}	$38^{s}.79$		19^{h} 8^{m}	$36^{s}.99$		20^{h} 49^{m}	$1^{s}.268$		23^{h} 27^{m}	$45^{s}.399$
	+82° 11′	0″.93		+86° 36′	51″.01		+89° 0′	33″.82		+82° 12′	22″.39		+86° 49′	19″.56

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

ε Ursæ Minoris. Mag. 4.4			**δ Ursæ Minoris.** Mag. 4.4			**λ Ursæ Minoris.** Mag. 6.6			**76 Draconis.** Mag. 5.7			**39 H. Cephei.** Mag. 5.6		
Mean Solar Date.	**Right Ascension.**	**Declination** *North.*	**Mean Solar Date.**	**Right Ascension.**	**Declination** *North.*	**Mean Solar Date.**	**Right Ascension.**	**Declination** *North.*	**Mean Solar Date.**	**Right Ascension.**	**Declination** *North.*	**Mean Solar Date.**	**Right Ascension.**	**Declination** *North.*
	h m	° ′		h m	° ′		h m	° ′		h m	° ′		h m	° ′
Sept.	16 54	+82 11	Sept.	18 0	+86 36	Sept.	19 7	+89 0	Sept.	20 49	+82 12	Sept.	23 27	+86 49
	s	″		s	″		s	″		s	″		s	″
1.3	55.35	8.42	1.3	35.44	59.74	1.4	90.97	43.27	1.4	4.22	32.66	1.5	56.40	25.83
2.3	55.16	8.46	2.3	35.03	59.89	2.3	89.77	43.52	2.4	4.14	33.02	2.5	56.52	26.22
3.3	54.96	8.49	3.3	34.60	60.03	3.3	88.47	43.77	3.4	4.04	33.39	3.5	56.62	26.64
4.3	54.76	8.49	4.3	34.14	60.15	4.3	87.08	44.00	4.4	3.94	33.77	4.5	56.68	27.07
5.2	54.55	8.45	5.3	33.66	60.25	5.3	85.61	44.22	5.4	3.82	34.13	5.5	56.72	27.51
6.2	54.35	8.40	6.3	33.18	60.31	6.3	84.11	44.40	6.4	3.69	34.45	6.5	56.73	27.93
7.2	54.16	8.32	7.3	32.72	60.35	7.3	82.62	44.56	7.4	3.56	34.75	7.5	56.70	28.36
8.2	53.99	8.24	8.3	32.28	60.37	8.3	81.17	44.70	8.4	3.42	35.03	8.5	56.65	28.76
9.2	53.82	8.15	9.3	31.86	60.39	9.3	79.80	44.81	9.4	3.30	35.30	9.5	56.62	29.13
10.2	53.66	8.07	10.3	31.46	60.41	10.3	78.50	44.94	10.4	3.19	35.55	10.5	56.59	29.49
11.2	53.50	8.02	11.3	31.08	60.45	11.3	77.28	45.07	11.4	3.08	35.81	11.5	56.59	29.84
12.2	53.33	7.98	12.3	30.69	60.50	12.3	76.07	45.22	12.4	2.98	36.10	12.5	56.62	30.19
13.2	53.16	7.96	13.3	30.30	60.58	13.3	74.85	45.39	13.4	2.88	36.39	13.5	56.66	30.56
14.2	52.97	7.95	14.3	29.88	60.67	14.3	73.56	45.58	14.4	2.78	36.71	14.5	56.71	30.94
15.2	52.78	7.92	15.3	29.45	60.76	15.3	72.22	45.77	15.4	2.68	37.03	15.5	56.75	31.35
16.2	52.59	7.89	16.3	29.01	60.83	16.3	70.80	45.96	16.4	2.56	37.35	16.5	56.77	31.76
17.2	52.39	7.82	17.3	28.54	60.87	17.3	69.33	46.14	17.4	2.43	37.68	17.5	56.76	32.19
18.2	52.19	7.73	18.3	28.07	60.91	18.3	67.80	46.30	18.4	2.28	37.99	18.5	56.73	32.61
19.2	52.00	7.62	19.3	27.60	60.92	19.3	66.25	46.43	19.4	2.14	38.26	19.5	56.68	33.03
20.2	51.81	7.49	20.3	27.14	60.90	20.3	64.70	46.55	20.4	1.99	38.52	20.5	56.58	33.44
21.2	51.63	7.35	21.2	26.69	60.88	21.3	63.18	46.65	21.4	1.85	38.77	21.5	56.48	33.83
22.2	51.46	7.20	22.2	26.25	60.85	22.3	61.70	46.72	22.4	1.70	39.01	22.5	56.37	34.21
23.2	51.30	7.06	23.2	25.84	60.81	23.3	60.26	46.79	23.4	1.56	39.23	23.5	56.27	34.57
24.2	51.14	6.92	24.2	25.43	60.76	24.3	58.87	46.86	24.4	1.42	39.44	24.5	56.17	34.92
25.2	50.98	6.79	25.2	25.04	60.73	25.3	57.54	46.93	25.4	1.29	39.65	25.5	56.10	35.25
26.2	50.83	6.69	26.2	24.66	60.72	26.3	56.24	47.00	26.4	1.17	39.88	26.5	56.03	35.60
27.2	50.67	6.59	27.2	24.27	60.72	27.3	54.93	47.10	27.3	1.05	40.12	27.5	55.98	35.95
28.2	50.51	6.51	28.2	23.86	60.72	28.3	53.61	47.22	28.3	0.94	40.38	28.5	55.95	36.32
29.2	50.33	6.42	29.2	23.43	60.74	29.3	52.23	47.35	29.3	0.80	40.64	29.5	55.90	36.71
30.2	50.15	6.32	30.2	22.99	60.76	30.3	50.75	47.48	30.3	0.66	40.92	30.5	55.85	37.11
31.2	49.96	6.19	31.2	22.52	60.74	31.3	49.17	47.61	31.3	0.51	41.19	31.4	55.78	37.53
32.2	49.76	6.03	32.2	22.03	60.72	32.3	47.53	47.71	32.3	0.34	41.45	32.4	55.67	37.96
	7.35	+7.29		16.95	+16.92		58.03	+58.02		7.38	+7.31		18.06	+18.03
	$16^h\ 54^m\ 56^s.786$			$18^h\ 0^m\ 38^s.79$			$19^h\ 8^m\ 36^s.99$			$20^h\ 49^m\ 1^s.268$			$23^h\ 27^m\ 45^s.399$	
	+82° 11′ 0″.93			+86° 36′ 51″.01			+89° 0′ 33″.82			+82° 12′ 22″.39			+86° 49′ 19″.56	

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

ε Ursæ Minoris. Mag. 4.4			**δ Ursæ Minoris.** Mag. 4.4			**λ Ursæ Minoris.** Mag. 6.6			**76 Draconis.** Mag. 5.7			**89 H. Cephei.** Mag. 5.6		
Mean Solar Date.	**Right Ascension.**	**Declination** ***North.***	**Mean Solar Date.**	**Right Ascension.**	**Declination** ***North.***	**Mean Solar Date.**	**Right Ascension.**	**Declination** ***North.***	**Mean Solar Date.**	**Right Ascension.**	**Declination** ***North.***	**Mean Solar Date.**	**Right Ascension.**	**Declination** ***North.***
	h m	° ′		h m	° ′		h m	° ′		h m	° ′		h m	° ′
Oct.	16 54	+82 10	Oct.	18 0	+86 36	Oct.	19 7	+89 0	Oct.	20 48	+82 12	Oct.	23 27	+86 49
	s	″		s	″		s	″		s	″		s	″
1.2	49.96	66.19	1.2	22.52	60.74	1.3	49.17	47.61	1.3	60.51	41.19	1.4	55.78	37.53
2.2	49.76	66.03	2.2	22.03	60.72	2.3	47.53	47.71	2.3	60.34	41.45	2.4	55.67	37.96
3.2	49.56	65.85	3.2	21.54	60.66	3.3	45.84	47.79	3.3	60.17	41.70	3.4	55.53	38.39
4.2	49.38	65.63	4.2	21.06	60.56	4.3	44.16	47.83	4.3	59.99	41.92	4.4	55.34	38.80
5.2	49.21	65.41	5.2	20.60	60.45	5.3	42.52	47.86	5.3	59.82	42.11	5.4	55.15	39.18
6.2	49.05	65.19	6.2	20.17	60.33	6.3	40.95	47.85	6.3	59.64	42.28	6.4	54.94	39.54
7.2	48.89	64.98	7.2	19.77	60.22	7.3	39.47	47.84	7.3	59.48	42.43	7.4	54.76	39.88
8.2	48.74	64.78	8.2	19.37	60.11	8.2	38.07	47.84	8.3	59.33	42.59	8.4	54.59	40.21
9.2	48.60	64.60	9.2	18.98	60.03	9.2	36.71	47.85	9.3	59.19	42.75	9.4	54.46	40.54
10.2	48.47	64.45	10.2	18.59	59.96	10.2	35.35	47.88	10.3	59.05	42.94	10.4	54.34	40.88
11.1	48.31	64.30	11.2	18.21	59.91	11.2	33.97	47.95	11.3	58.91	43.14	11.4	54.22	41.23
12.1	48.15	64.14	12.2	17.79	59.87	12.2	32.52	48.01	12.3	58.76	43.34	12.4	54.11	41.60
13.1	47.97	63.98	13.2	17.35	59.82	13.2	31.00	48.06	13.3	58.60	43.56	13.4	53.99	41.98
14.1	47.79	63.79	14.2	16.89	59.74	14.2	29.44	48.12	14.3	58.44	43.77	14.4	53.84	42.37
15.1	47.63	63.58	15.2	16.43	59.64	15.2	27.81	48.16	15.3	58.27	43.96	15.4	53.65	42.76
16.1	47.45	63.35	16.2	15.98	59.54	16.2	26.17	48.16	16.3	58.08	44.15	16.4	53.45	43.14
17.1	47.30	63.09	17.2	15.54	59.39	17.2	24.53	48.16	17.3	57.90	44.30	17.4	53.24	43.51
18.1	47.15	62.83	18.2	15.11	59.23	18.2	22.93	48.13	18.3	57.72	44.44	18.4	52.98	43.86
19.1	47.00	62.56	19.2	14.70	59.06	19.2	21.38	48.09	19.3	57.53	44.56	19.4	52.72	44.20
20.1	46.87	62.29	20.2	14.31	58.89	20.2	19.87	48.03	20.3	57.36	44.66	20.4	52.46	44.52
21.1	46.75	62.03	21.2	13.92	58.71	21.2	18.41	47.96	21.3	57.19	44.75	21.4	52.20	44.82
22.1	46.63	61.76	22.2	13.55	58.55	22.2	17.02	47.89	22.3	57.03	44.84	22.4	51.96	45.11
23.1	46.51	61.52	23.2	13.20	58.39	23.2	15.68	47.82	23.3	56.86	44.92	23.4	51.74	45.40
24.1	46.38	61.30	24.2	12.85	58.26	24.2	14.37	47.79	24.3	56.71	45.03	24.4	51.54	45.69
25.1	46.25	61.09	25.2	12.49	58.13	25.2	13.04	47.76	25.3	56.56	45.15	25.4	51.34	46.00
26.1	46.12	60.88	26.2	12.12	58.01	26.2	11.67	47.74	26.3	56.40	45.27	26.4	51.16	46.32
27.1	45.97	60.65	27.2	11.73	57.89	27.2	10.23	47.73	27.3	56.25	45.42	27.4	50.97	46.66
28.1	45.82	60.41	28.1	11.31	57.77	28.2	8.70	47.72	28.3	56.07	45.57	28.4	50.76	47.01
29.1	45.67	60.16	29.1	10.87	57.62	29.2	7.12	47.69	29.3	55.88	45.70	29.4	50.52	47.37
30.1	45.51	59.87	30.1	10.44	57.44	30.2	5.46	47.64	30.3	55.68	45.83	30.4	50.24	47.73
31.1	45.36	59.55	31.1	10.01	57.23	31.2	3.81	47.55	31.3	55.49	45.91	31.4	49.93	48.08
32.1	45.23	59.21	32.1	9.60	56.98	32.2	2.20	47.43	32.3	55.28	45.98	32.4	49.60	48.40
	7.35	+7.28		16.94	+16.91		58.07	+58.06		7.38	+7.31		18.08	+18.05
	16^{h} 54^{m}	$56^{s}.786$		18^{h} 0^{m}	$38^{s}.79$		19^{h} 8^{m}	$36^{s}.99$		20^{h} 49^{m}	$1^{s}.268$		23^{h} 27^{m}	$45^{s}.399$
	+82° 11′	0″.93		+86° 36′	51″.01		+89° 0′	33″.82		+82° 12′	22″.39		+86° 49′	19″.56

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

ε Ursæ Minoris.			**δ Ursæ Minoris.**			**λ Ursæ Minoris.**			**76 Draconis.**			**39 H. Cephei.**		
Mag. 4.4			Mag. 4.4			Mag. 6.6			Mag. 5.7			Mag. 5.6		
Mean Solar Date.	**Right Ascension.**	**Declination *North*.**	**Mean Solar Date.**	**Right Ascension.**	**Declination *North*.**	**Mean Solar Date.**	**Right Ascension.**	**Declination *North*.**	**Mean Solar Date.**	**Right Ascension.**	**Declination *North*.**	**Mean Solar Date.**	**Right Ascension.**	**Declination *North*.**
	h m	° ′		h m	° ′		h m	° ′		h m	° ′		h m	° ′
Nov.	16 54	+82 10	Nov.	18 0	+86 36	Nov.	19 6	+89 0	Nov.	20 48	+82 12	Nov.	23 27	+86 49
	s	″		s	″		s	″		s	″		s	″
1.1	45.23	59.21	1.1	9.60	56.98	1.2	62.20	47.43	1.3	55.28	45.98	1.4	49.60	48.40
2.1	45.11	58.86	2.1	9.22	56.73	2.2	60.67	47.29	2.3	55.09	46.01	2.4	49.27	48.70
3.1	45.01	58.53	3.1	8.88	56.48	3.2	59.23	47.16	3.2	54.91	46.03	3.4	48.93	48.97
4.1	44.91	58.22	4.1	8.56	56.24	4.2	57.89	47.01	4.2	54.74	46.04	4.4	48.61	49.21
5.1	44.82	57.93	5.1	8.26	56.02	5.2	56.62	46.87	5.2	54.57	46.05	5.4	48.32	49.45
6.1	44.73	57.65	6.1	7.95	55.83	6.2	55.37	46.75	6.2	54.41	46.09	6.4	48.05	49.70
7.1	44.63	57.40	7.1	7.62	55.64	7.2	54.11	46.65	7.2	54.26	46.14	7.3	47.80	49.95
8.1	44.52	57.14	8.1	7.30	55.46	8.2	52.82	46.57	8.2	54.11	46.20	8.3	47.56	50.23
9.1	44.40	56.87	9.1	6.95	55.28	9.2	51.48	46.48	9.2	53.95	46.27	9.3	47.31	50.52
10.1	44.29	56.58	10.1	6.59	55.09	10.2	50.08	46.40	10.2	53.77	46.34	10.3	47.05	50.82
11.1	44.17	56.28	11.1	6.22	54.89	11.2	48.62	46.31	11.2	53.59	46.39	11.3	46.74	51.11
12.1	44.05	55.95	12.1	5.85	54.66	12.2	47.14	46.19	12.2	53.40	46.43	12.3	46.41	51.40
13.1	43.94	55.61	13.1	5.49	54.40	13.2	45.67	46.04	13.2	53.21	46.45	13.3	46.07	51.69
14.1	43.85	55.25	14.1	5.15	54.13	14.1	44.23	45.88	14.2	53.01	46.44	14.3	45.69	51.94
15.1	43.76	54.89	15.1	4.83	53.84	15.1	42.84	45.70	15.2	52.83	46.41	15.3	45.31	52.17
16.1	43.68	54.52	16.1	4.53	53.54	16.1	41.50	45.50	16.2	52.65	46.36	16.3	44.94	52.39
17.0	43.62	54.17	17.1	4.26	53.24	17.1	40.25	45.28	17.2	52.47	46.30	17.3	44.56	52.59
18.0	43.56	53.82	18.1	4.01	52.96	18.1	39.07	45.08	18.2	52.30	46.24	18.3	44.19	52.78
19.0	43.50	53.48	19.1	3.77	52.67	19.1	37.95	44.88	19.2	52.14	46.17	19.3	43.85	52.96
20.0	43.44	53.16	20.1	3.54	52.41	20.1	36.86	44.68	20.2	51.99	46.11	20.3	43.53	53.13
21.0	43.39	52.85	21.1	3.30	52.16	21.1	35.78	44.52	21.2	51.84	46.07	21.3	43.21	53.31
22.0	43.32	52.56	22.1	3.05	51.93	22.1	34.71	44.36	22.2	51.70	46.03	22.3	42.90	53.49
23.0	43.24	52.25	23.1	2.78	51.70	23.1	33.56	44.21	23.2	51.54	46.03	23.3	42.60	53.70
24.0	43.16	51.94	24.1	2.50	51.47	24.1	32.35	44.07	24.2	51.37	46.02	24.3	42.29	53.92
25.0	43.07	51.62	25.1	2.20	51.21	25.1	31.06	43.91	25.2	51.20	46.00	25.3	41.96	54.15
26.0	42.98	51.26	26.1	1.89	50.94	26.1	29.73	43.73	26.2	51.03	45.97	26.3	41.59	54.38
27.0	42.90	50.88	27.1	1.59	50.64	27.1	28.39	43.53	27.2	50.83	45.91	27.3	41.18	54.60
28.0	42.83	50.48	28.1	1.31	50.31	28.1	27.07	43.29	28.2	50.64	45.82	28.3	40.75	54.80
29.0	42.78	50.07	29.1	1.05	49.96	29.1	25.84	43.03	29.2	50.46	45.71	29.3	40.32	54.97
30.0	42.75	49.66	30.1	0.83	49.61	30.1	24.70	42.75	30.2	50.27	45.57	30.3	39.89	55.12
31.0	42.73	49.27	31.1	0.64	49.25	31.1	23.65	42.46	31.2	50.10	45.43	31.3	39.46	55.23
	7.35	+7.28		16.94	+16.91		58.04	+58.03		7.38	+7.31		18.09	+18.06
	$16^{h}\ 54^{m}$	$56^{s}.786$		$18^{h}\ 0^{m}$	$38^{s}.79$		$19^{h}\ 8^{m}$	$36^{s}.99$		$20^{h}\ 49^{m}$	$1^{s}.268$		$23^{h}\ 27^{m}$	$45^{s}.399$
	+82° 11′	0″.93		+86° 36′	51″.01		+89° 0′	33″.82		+82° 12′	22″.39		+86° 49′	19″.56

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

ε Ursæ Minoris. Mag. 4.4			**δ Ursæ Minoris.** Mag. 4.4			**λ Ursæ Minoris.** Mag. 6.6			**76 Draconis.** Mag. 5.7			**39 H. Cephei.** Mag. 5.6		
Mean Solar Date.	**Right Ascension.**	**Declination** *North.*	**Mean Solar Date.**	**Right Ascension.**	**Declination** *North.*	**Mean Solar Date.**	**Right Ascension.**	**Declination** *North.*	**Mean Solar Date.**	**Right Ascension.**	**Declination** *North.*	**Mean Solar Date.**	**Right Ascension.**	**Declination** *North.*
	h m	° ′		h m	° ′		h m	° ′		h m	° ′		h m	° ′
Dec.	16 54	+82 10	Dec.	17 59	+86 36	Dec.	19 6	+89 0	Dec.	20 48	+82 12	Dec.	23 27	+86 49
	s	″		s	″		s	″		s	″		s	″
1.0	42.73	49.27	1.1	60.64	49.25	1.1	23.65	42.46	1.2	50.10	45.43	1.3	39.46	55.23
2.0	42.71	48.90	2.1	60.47	48.92	2.1	22.72	42.19	2.2	49.95	45.28	2.3	39.08	55.34
3.0	42.69	48.56	3.0	60.31	48.62	3.1	21.84	41.93	3.2	49.81	45.15	3.3	38.72	55.44
4.0	42.67	48.23	4.0	60.15	48.34	4.1	20.99	41.71	4.2	49.68	45.03	4.3	38.37	55.55
4.9	42.64	47.92	5.0	59.97	48.06	5.1	20.11	41.49	5.2	49.55	44.93	5.3	38.04	55.67
5.9	42.60	47.60	6.0	59.79	47.80	6.1	19.17	41.29	6.2	49.42	44.83	6.3	37.71	55.80
6.9	42.56	47.28	7.0	59.59	47.53	7.1	18.20	41.09	7.2	49.27	44.75	7.3	37.36	55.94
7.9	42.52	46.94	8.0	59.38	47.23	8.1	17.18	40.88	8.2	49.11	44.66	8.3	37.00	56.09
8.9	42.48	46.58	9.0	59.17	46.92	9.1	16.13	40.65	9.1	48.96	44.54	9.3	36.61	56.23
9.9	42.45	46.19	10.0	58.97	46.59	10.1	15.08	40.39	10.1	48.79	44.40	10.3	36.19	56.36
10.9	42.43	45.80	11.0	58.78	46.23	11.1	14.07	40.11	11.1	48.62	44.24	11.3	35.76	56.48
11.9	42.41	45.39	12.0	58.61	45.87	12.1	13.11	39.81	12.1	48 45	44.06	12.3	35.32	56.57
12.9	42.41	44.99	13.0	58.47	45.50	13.1	12.21	39.51	13.1	48.30	43.85	13.2	34.87	56.64
13.9	42.42	44.60	14.0	58.34	45.12	14.1	11.39	39.19	14.1	48.15	43.64	14.2	34.43	56.69
14.9	42.43	44.21	15.0	58.24	44.76	15.1	10.66	38.86	15.1	48.02	43.42	15.2	34.00	56.72
15.9	42.46	43.84	16.0	58.17	44.41	16.1	9.99	38.55	16.1	47.89	43.21	16.2	33.59	56.73
16.9	42.49	43.49	17.0	58.11	44.08	17.1	9.39	38.25	17.1	47.76	43.00	17.2	33.20	56.74
17.9	42.52	43.14	18.0	58.06	43.75	18.1	8.82	37.97	18.1	47.64	42.79	18.2	32.84	56.76
18.9	42.54	42.82	19.0	57.99	43.45	19.1	8.25	37.70	19.1	47.53	42.60	19.2	32.49	56.78
19.9	42.54	42.50	20.0	57.91	43.15	20.0	7.66	37.44	20.1	47.42	42.42	20.2	32.15	56.82
20.9	42.55	42.18	21.0	57.80	42.85	21.0	7.01	37.19	21.1	47.31	42.26	21.2	31.81	56.87
21.9	42.55	41.85	21.9	57.69	42.56	22.0	6.28	36.94	22.1	47.18	42.10	22.2	31.44	56.94
22.9	42.55	41.50	22.9	57.57	42.24	23.0	5.49	36.67	23.1	47.05	41.93	23.2	31.04	57.01
23.9	42.56	41.13	23.9	57.45	41.89	24.0	4.71	36.39	24.1	46.90	41.75	24.2	30.63	57.07
24.9	42.57	40.73	24.9	57.35	41.52	25.0	3.93	36.06	25.1	46.75	41.54	25.2	30.18	57.10
25.9	42.59	40.33	25.9	57.27	41.13	26.0	3.21	35.71	26.1	46.61	41.29	26.2	29.72	57.12
26.9	42.63	39.93	26.9	57.22	40.74	27.0	2.60	35.36	27.1	46.47	41.02	27.2	29.26	57.11
27.9	42.69	39.53	27.9	57.20	40.34	28.0	2.10	35.00	28.1	46.35	40.74	28.2	28.82	57.06
28.9	42.75	39.16	28.9	57.21	39.96	29.0	1.70	34.64	29.1	46.24	40.45	29.2	28.40	56.99
29.9	42.81	38.82	29.9	57.24	39.60	30.0	1.40	34.30	30.1	46.15	40.16	30.2	28.01	56.92
30.9	42.87	38.51	30.9	57.28	39.28	31.0	1.13	33.97	31.1	46.07	39.91	31.2	27.66	56.86
31.9	42.93	38.20	31.9	57.31	38.98	32.0	0.86	33.67	32.1	45.99	39.67	32.2	27.33	56.82
	7.35	+7.28		16.92	+16.89		57.93	+57.92		7.38	+7.31		18.10	+18.07
	$16^h\ 54^m$	$56^s.786$		$18^h\ 0^m$	$38^s.79$		$19^h\ 8^m$	$36^s.99$		$20^h\ 49^m$	$1^s.268$		$23^h\ 27^m$	$45^s.399$
	+82° 11′	0″.93		+86° 36′	51″.01		+89° 0′	33″.82		+82° 12′	22″.39		+86° 49′	19″.56

an Solar Date.	38 Piscium. Mag. 4.7				α Andromedæ. Mag. 2.2				β Cassiopeiæ. Mag. 2.4				ε Phœnicis. Mag. 3.9			
	Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination S.	
	h m 0 0		° ′ − 6 11		h m 0 3		° ′ +28 36		h m 0 4		° ′ +58 39		h m 0 4		° ′ −46 13	
	s		″		s		″		s		″		s		″	
n. 0.2	49.31		65.8		49.23		22.3		26.88		65.8		56.67		77.3	
10.2	49.21	10	66.4	6	49.10	13	21.5	8	26.57	31	65.1	7	56.48	19	76.9	4
20.2	49.12	9	66.8	4	48.97	13	20.4	11	26.28	29	63.9	12	56.31	17	76.0	9
30.1	49.04	8	67.1	3	48.86	11	19.0	14	26.01	27	62.3	16	56.16	15	74.7	13
b. 9.1	48.98	6	67.2	1	48.76	10	17.5	15	25.77	24	60.3	20	56.04	12	73.0	17
19.1	48.94	4	67.1	1	48.69	7	16.0	15	25.58	19	57.9	24	55.95	9	70.9	21
29.1	48.92	2	66.9	2	48.65	4	14.4	16	25.45	13	55.4	25	55.90	5	68.6	23
ar. 10.0	48.93	1	66.4	5	48.65	0	12.9	15	25.39	6	52.7	27	55.89	1	65.9	27
20.0	48.98	5	65.7	7	48.69	4	11.5	14	25.41	2	50.1	26	55.92	3	63.0	29
30.0	49.06	8	64.8	9	48.77	8	10.4	11	25.50	9	47.6	25	56.01	9	60.0	30
r. 9.0	49.18	12	63.6	12	48.90	13	9.5	9	25.68	18	45.3	23	56.14	13	56.8	32
18.9	49.34	16	62.2	14	49.08	18	9.0	5	25.93	25	43.3	20	56.33	19	53.6	32
28.9	49.54	20	60.6	16	49.30	22	8.8	2	26.25	32	41.8	15	56.57	24	50.4	32
ay 8.9	49.78	24	58.8	18	49.56	26	9.0	2	26.63	38	40.7	11	56.85	28	47.4	30
18.8	50.05	27	56.8	20	49.85	29	9.6	6	27.07	44	40.1	6	57.18	33	44.5	29
28.8	50.34	29	54.7	21	50.17	32	10.6	10	27.55	48	40.1	0	57.54	36	41.8	27
ne 7.8	50.65	31	52.6	21	50.51	34	11.9	13	28.05	50	40.5	4	57.93	39	39.4	24
17.8	50.97	32	50.5	21	50.86	35	13.6	17	28.57	52	41.5	10	58.34	41	37.3	21
27.7	51.30	33	48.4	21	51.21	35	15.6	20	29.08	51	43.0	15	58.76	42	35.6	17
ly 7.7	51.62	32	46.4	20	51.56	35	17.8	22	29.58	50	45.0	20	59.18	42	34.4	12
17.7	51.93	31	44.5	19	51.89	33	20.2	24	30.06	48	47.3	23	59.58	40	33.6	8
27.7	52.21	28	42.9	16	52.19	30	22.7	25	30.50	44	50.0	27	59.96	38	33.3	3
g. 6.6	52.47	26	41.4	15	52.47	28	25.2	25	30.89	39	53.0	30	60.31	35	33.5	2
16.6	52.70	23	40.2	12	52.71	24	27.8	26	31.23	34	56.2	32	60.61	30	34.1	6
26.6	52.89	19	39.3	9	52.91	20	30.3	25	31.50	27	59.6	34	60.87	26	35.2	11
pt. 5.5	53.05	16	38.7	6	53.07	16	32.8	25	31.72	22	63.0	34	61.07	20	36.7	15
15.5	53.16	11	38.3	4	53.19	12	35.1	23	31.87	15	66.5	35	61.21	14	38.5	18
25.5	53.24	8	38.2	1	53.27	8	37.2	21	31.96	9	69.9	34	61.30	9	40.5	20
t. 5.5	53.28	4	38.3	1	53.31	4	39.2	20	31.99	3	73.2	33	61.33	3	42.7	22
15.4	53.28	0	38.6	3	53.32	1	40.9	17	31.96	3	76.3	31	61.31	2	45.0	23
25.4	53.26	2	39.1	5	53.29	3	42.3	14	31.88	8	79.2	29	61.24	7	47.2	22
v. 4.4	53.21	5	39.7	6	53.24	5	43.5	12	31.74	14	81.8	26	61.13	11	49.3	21
14.4	53.15	6	40.4	7	53.17	7	44.4	9	31.55	19	84.0	22	60.99	14	51.2	19
24.3	53.07	8	41.1	7	53.07	10	44.9	5	31.33	22	85.7	17	60.82	17	52.8	16
c. 4.3	52.98	9	41.8	7	52.96	11	45.2	3	31.07	26	87.0	13	60.63	19	54.1	13
14.3	52.88	10	42.5	7	52.84	12	45.1	1	30.79	28	87.8	8	60.43	20	54.9	8
24.2	52.78	10	43.1	6	52.71	13	44.8	3	30.49	30	88.0	2	60.23	20	55.2	3
34.2	52.68	10	43.7	6	52.58	13	44.1	7	30.19	30	87.6	4	60.04	19	55.1	1
δ, Tan δ	1.006		−0.109		1.139		+0.545		1.923		+1.643		1.446		−1.044	
n Place	49ˢ.898		59″.45		50ˢ.162		16″.59		28ˢ.504		51″.97		56ˢ.832		58″.96	
a, Dω a	0.00		+0.01		0.00		−0.04		0.00		−0.11		0.00		+0.07	
δ, Dω δ	+0.4		0.0		+0.4		0.0		+0.4		0.0		+0.4		0.0	

APPARENT PLACES OF STARS, 1912.

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	22 Andromedæ. Mag. 5.1				γ Pegasi. Mag. 2.9				σ Andromedæ. Mag. 4.5				ι Ceti. Mag. 3.8			
	Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination S.	
	h m 0 5		° ′ +45 34		h m 0 8		° ′ +14 41		h m 0 13		° ′ +36 17		h m 0 14		° ′ − 9 18	
	s		″		s		″		s		″		s		″	
Jan. 0.2	43.36	20	68.1	8	41.42	11	41.0	8	42.63	15	59.0	7	56.19	10	49.0	5
10.2	43.16	19	67.3	12	41.31	10	40.2	9	42.48	16	58.3	11	56.09	9	49.5	4
20.2	42.97	17	66.1	16	41.21	9	39.3	9	42.32	14	57.2	14	56.00	9	49.9	2
30.2	42.80	15	64.5	18	41.12	8	38.4	10	42.18	12	55.8	16	55.91	8	50.1	0
Feb. 9.1	42.65	12	62.7	21	41.04	6	37.4	10	42.06	10	54.2	18	55.83	5	50.1	2
19.1	42.53	8	60.6	22	40.98	3	36.4	9	41.96	6	52.4	18	55.78	3	49.9	5
29.1	42.45	3	58.4	22	40.95	0	35.5	7	41.90	2	50.6	19	55.75	0	49.4	6
Mar. 10.0	42.42	3	56.2	22	40.95	4	34.8	6	41.88	2	48.7	17	55.75	3	48.8	9
20.0	42.45	9	54.0	20	40.99	7	34.2	3	41.90	7	47.0	16	55.78	7	47.9	11
30.0	42.54	14	52.0	17	41.06	12	33.9	1	41.97	13	45.4	13	55.85	11	46.8	13
April 9.0	42.68	20	50.3	14	41.18	16	33.8	2	42.10	17	44.1	9	55.96	14	45.5	16
18.9	42.88	25	48.9	10	41.34	20	34.0	5	42.27	22	43.2	6	56.10	19	43.9	18
28.9	43.13	30	47.9	6	41.54	24	34.5	8	42.49	27	42.6	2	56.29	23	42.1	19
May 8.9	43.43	35	47.3	1	41.78	27	35.3	12	42.76	31	42.4	2	56.52	26	40.2	21
18.8	43.78	38	47.2	4	42.05	29	36.5	15	43.07	34	42.6	6	56.78	28	38.1	22
28.8	44.16	40	47.6	8	42.34	32	38.0	17	43.41	36	43.2	11	57.06	31	35.9	22
June 7.8	44.56	41	48.4	13	42.66	33	39.7	19	43.77	37	44.3	14	57.37	32	33.7	22
17.8	44.97	42	49.7	17	42.99	33	41.6	21	44.14	37	45.7	18	57.69	33	31.5	21
27.7	45.39	40	51.4	21	43.32	33	43.7	21	44.51	37	47.5	21	58.02	32	29.4	20
July 7.7	45.79	38	53.5	24	43.65	31	45.8	22	44.88	35	49.6	23	58.34	31	27.4	18
17.7	46.17	35	55.9	27	43.96	29	48.0	23	45.23	33	51.9	26	58.65	30	25.6	16
27.7	46.52	32	58.6	29	44.25	27	50.3	22	45.56	30	54.5	27	58.95	27	24.0	13
Aug. 6.6	46.84	28	61.5	30	44.52	23	52.5	20	45.86	26	57.2	27	59.22	24	22.7	11
16.6	47.12	23	64.5	31	44.75	20	54.5	19	46.12	22	59.9	28	59.46	20	21.6	7
26.6	47.35	19	67.6	31	44.95	16	56.4	18	46.34	18	62.7	27	59.66	17	20.9	5
Sept. 5.5	47.54	13	70.7	30	45.11	12	58.2	16	46.52	14	65.4	27	59.83	13	20.4	2
15.5	47.67	8	73.7	30	45.23	8	59.8	14	46.66	9	68.1	25	59.96	9	20.2	1
25.5	47.75	4	76.7	28	45.31	5	61.2	11	46.75	5	70.6	24	60.05	5	20.3	3
Oct. 5.5	47.79	0	79.5	26	45.36	2	62.3	9	46.80	2	73.0	21	60.10	2	20.6	5
15.4	47.79	5	82.1	23	45.38	2	63.2	7	46.82	2	75.1	19	60.12	1	21.1	6
25.4	47.74	8	84.4	20	45.36	4	63.9	5	46.80	5	77.0	16	60.11	4	21.7	8
Nov. 4.4	47.66	12	86.4	17	45.32	5	64.4	3	46.75	8	78.6	13	60.07	6	22.5	9
14.4	47.54	14	88.1	12	45.27	8	64.7	0	46.67	11	79.9	9	60.01	7	23.4	8
24.3	47.40	16	89.3	9	45.19	9	64.7	2	46.56	12	80.8	6	59.94	9	24.2	8
Dec. 4.3	47.24	18	90.2	4	45.10	10	64.5	4	46.44	14	81.4	3	59.85	9	25.0	8
14.3	47.06	19	90.6	1	45.00	11	64.1	5	46.30	15	81.7	2	59.76	10	25.8	7
24.2	46.87	20	90.5	5	44.89	11	63.6	7	46.15	15	81.5	5	59.66	11	26.5	6
34.2	46.67		90.0		44.78		62.9		46.00		81.0		59.55		27.1	
Sec δ, Tan δ	1.429		+1.021		1.034		+0.262		1.241		+0.735		1.013		−0.164	
Mean Place	44ˢ.571		57″.27		42ˢ.161		39″.75		43ˢ.613		50″.52		56ˢ.674		42″.04	
D′ψ α, Dω α			−0.07		0.00		−0.02		0.00		−0.05		0.00		+0.01	
Dψ δ, Dω δ			0		+0.4		0.0		+0.4		+0.1		+0.4		+0.1	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	ζ Tucanæ. Mag. 4.3				44 Piscium. Mag. 6.0				β Hydri. Mag. 2.9				α Phœnicis. Mag. 2.4			
	Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination S.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	0 15		−65 23		0 20		+ 1 27		0 21		−77 44		0 21		−42 46	
	s		″		s		″		s		″		s		″	
Jan. 0.2	30.16	38	51.3	9	52.92	10	5.5	6	10.23	88	81.9	11	56.19	17	79.0	2
10.2	29.78	36	50.4	14	52.82	10	4.9	6	9.35	82	80.8	16	56.02	17	78.8	6
20.2	29.42	32	49.0	19	52.72	9	4.3	6	8.53	74	79.2	22	55.85	15	78.2	10
30.2	29.10	28	47.1	24	52.63	8	3.7	5	7.79	64	77.0	27	55.70	13	77.2	14
Feb. 9.1	28.82	22	44.7	28	52.55	6	3.2	3	7.15	53	74.3	31	55.57	10	75.8	18
19.1	28.60	15	41.9	31	52.49	3	2.9	1	6.62	39	71.2	34	55.47	7	74.0	22
29.1	28.45	8	38.8	34	52.46	1	2.8	0	6.23	25	67.8	37	55.40	4	71.8	24
Mar. 10.0	28.37	1	35.4	36	52.45	3	2.8	2	5.98	10	64.1	38	55.36	1	69.4	27
20.0	28.36	7	31.8	37	52.48	6	3.0	5	5.88	5	60.3	39	55.37	6	66.7	29
30.0	28.43	16	28.1	38	52.54	10	3.5	7	5.93	21	56.4	39	55.43	11	63.8	31
Apr. 9.0	28.59	24	24.3	37	52.64	15	4.2	9	6.14	37	52.5	38	55.54	16	60.7	31
18.9	28.83	32	20.6	36	52.79	18	5.1	12	6.51	51	48.7	36	55.70	21	57.6	31
28.9	29.15	39	17.0	34	52.97	22	6.3	15	7.02	66	45.1	34	55.91	25	54.5	31
May 8.9	29.54	46	13.6	31	53.19	25	7.8	17	7.68	79	41.7	31	56.16	30	51.4	30
18.9	30.00	52	10.5	28	53.44	28	9.5	18	8.47	89	38.6	27	56.46	34	48.4	28
28.8	30.52	57	7.7	24	53.72	31	11.3	20	9.36	99	35.9	23	56.80	36	45.6	26
June 7.8	31.09	60	5.3	20	54.03	32	13.3	21	10.35	106	33.6	18	57.16	38	43.0	22
17.8	31.69	62	3.3	15	54.35	32	15.4	21	11.41	110	31.8	12	57.54	40	40.8	19
27.7	32.31	62	1.8	9	54.67	32	17.5	21	12.51	112	30.6	7	57.94	40	38.9	15
July 7.7	32.93	61	0.9	4	54.99	31	19.6	20	13.63	110	29.9	1	58.34	39	37.4	10
17.7	33.54	58	0.5	2	55.30	30	21.6	19	14.73	105	29.8	4	58.73	37	36.4	5
27.7	34.12	54	0.7	7	55.60	27	23.5	17	15.78	97	30.2	10	59.10	34	35.9	1
Aug. 6.6	34.66	47	1.4	12	55.87	24	25.2	16	16.75	87	31.2	16	59.44	31	35.8	4
16.6	35.13	40	2.6	17	56.11	20	26.8	13	17.62	73	32.8	20	59.75	26	36.2	8
26.6	35.53	32	4.3	21	56.31	17	28.1	11	18.35	58	34.8	24	60.01	21	37.0	12
Sept. 5.6	35.85	23	6.4	24	56.48	13	29.2	8	18.93	41	37.2	27	60.22	16	38.2	16
15.5	36.08	13	8.8	27	56.61	10	30.0	6	19.34	22	39.9	29	60.38	11	39.8	19
25.5	36.21	4	11.5	28	56.71	6	30.6	3	19.56	3	42.8	30	60.49	5	41.7	21
Oct. 5.5	36.25	6	14.3	28	56.77	3	30.9	1	19.59	16	45.8	30	60.54	1	43.8	22
15.4	36.19	15	17.1	27	56.80	0	31.0	1	19.43	34	48.8	28	60.55	4	46.0	22
25.4	36.04	22	19.8	25	56.80	3	30.9	2	19.09	49	51.6	26	60.51	8	48.2	22
Nov. 4.4	35.82	29	22.3	21	56.77	5	30.7	4	18.60	64	54.2	22	60.43	12	50.4	20
14.4	35.53	34	24.4	17	56.72	6	30.3	5	17.96	76	56.4	17	60.31	14	52.4	17
24.3	35.19	38	26.1	12	56.66	8	29.8	5	17.20	84	58.1	12	60.17	16	54.1	13
Dec. 4.3	34.81	40	27.3	7	56.58	9	29.3	6	16.36	90	59.3	6	60.01	18	55.4	10
14.3	34.41	41	28.0	1	56.49	10	28.7	7	15.46	91	59.7	0	59.83	18	56.4	6
24.3	34.00	40	28.1	5	56.39	10	28.0	6	14.55	91	59.7	6	59.65	18	57.0	2
34.2	33.60		27.6		56.29		27.4		13.64		59.1		59.47		57.2	
Sec δ, Tan δ	2.401		−2.183		1.000		+0.025		4.713		−4.605		1.363		−0.925	
Mean Place	$29^{s}.743$		29″.80		$53^{s}.464$		8″.50		$8^{s}.620$		59″.48		$56^{s}.254$		61″.95	
$D'_{\psi} \alpha$, $D_{\omega} \alpha$	0.00		+0.15		0.00		0.00		−0.01		+0.31		0.00		+0.06	
$D_{\psi} \delta$, $D_{\omega} \delta$	+0.4		+0.1		+0.4		+0.1		+0.4		+0.1		+0.4		+0.1	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	**12 Ceti.** Mag. 6.0 Right Ascension.		**12 Ceti.** Declination S.		**13 Ceti.** Mag. 5.2 Right Ascension.		**13 Ceti.** Declination S.		**ζ Cassiopeiæ.** Mag. 3.7 Right Ascension.		**ζ Cassiopeiæ.** Declination N.		**π Andromed** Mag. 4.4 Right Ascension.		De tic
	h m 0 25		° ′ − 4 26		h m 0 30		° ′ − 4 4		h m 0 32		° ′ +53 24		h m 0 32		+3
	s		″		s		″		s		″		s		
Jan. 0.2	32.43		41.2		42.65		42.2		2.56		59.6		9.82		74.
10.2	32.32	11	41.8	6	42.55	10	42.8	6	2.31	25	59.2	4	9.67	15	73.
20.2	32.22	10	42.3	5	42.44	11	43.3	5	2.06	25	58.3	9	9.53	14	72.
30.2	32.13	9	42.6	3	42.35	9	43.6	3	1.82	24	57.0	13	9.39	14	71.
Feb. 9.1	32.05	8	42.8	2	42.27	8	43.8	2	1.60	22	55.3	17	9.26	13	70.
19.1	31.99	6	42.8	0	42.21	6	43.9	1	1.41	19	53.3	20	9.16	10	68.
29.1	31.95	4	42.7	1	42.16	5	43.8	1	1.27	14	51.0	23	9.08	8	67.
Mar. 10.1	31.94	1	42.3	4	42.14	2	43.5	3	1.19	8	48.6	24	9.04	4	65.
20.0	31.96	2	41.7	6	42.16	2	42.9	6	1.17	2	46.2	24	9.05	1	63.
30.0	32.02	6	40.9	8	42.21	5	42.1	8	1.21	4	43.9	23	9.10	5	62.
Apr. 9.0	32.11	9	39.9	10	42.30	9	41.1	10	1.33	12	41.8	21	9.20	10	61.
18.9	32.25	14	38.6	13	42.44	14	39.8	13	1.52	19	39.9	19	9.35	15	60.
28.9	32.43	18	37.0	16	42.61	17	38.3	15	1.77	25	38.4	15	9.55	20	60.
May 8.9	32.65	22	35.3	17	42.82	21	36.6	17	2.09	32	37.3	11	9.80	25	59.
18.9	32.90	25	33.4	19	43.07	25	34.7	19	2.46	37	36.7	6	10.08	28	60.
28.8	33.18	28	31.4	20	43.35	28	32.7	20	2.87	41	36.5	2	10.40	32	60.
June 7.8	33.48	30	29.3	21	43.65	30	30.6	21	3.31	44	36.8	3	10.74	34	61.
17.8	33.80	32	27.1	22	43.97	32	28.4	22	3.77	46	37.7	9	11.10	36	63.
27.8	34.12	32	25.0	21	44.30	33	26.3	21	4.24	47	39.0	13	11.47	37	64.
July 7.7	34.44	32	23.0	20	44.62	32	24.2	21	4.71	47	40.7	17	11.84	37	66.
17.7	34.75	31	21.0	20	44.93	31	22.3	19	5.16	45	42.8	21	12.19	35	68.
27.7	35.05	30	19.2	18	45.23	30	20.5	18	5.58	42	45.2	24	12.52	33	71.
Aug. 6.6	35.33	28	17.7	15	45.50	27	19.0	15	5.97	39	47.9	27	12.83	31	73
16.6	35.57	24	16.4	13	45.75	25	17.7	13	6.31	34	50.9	30	13.10	27	76
26.6	35.78	21	15.4	10	45.97	22	16.6	11	6.61	30	54.1	32	13.33	23	79
Sept. 5.6	35.95	17	14.7	7	46.15	18	15.8	8	6.86	25	57.3	32	13.53	20	81
15.5	36.09	14	14.2	5	46.29	14	15.3	5	7.05	19	60.5	32	13.69	16	84
25.5	36.19	10	14.0	2	46.40	11	15.1	2	7.18	13	63.7	32	13.80	11	86
Oct. 5.5	36.26	7	14.0	0	46.47	7	15.1	0	7.26	8	66.9	32	13.88	8	88
15.5	36.29	3	14.2	2	46.51	4	15.3	2	7.29	3	69.9	30	13.92	4	90
25.4	36.29	0	14.6	4	46.51	0	15.7	4	7.27	2	72.6	27	13.93	1	92
Nov. 4.4	36.27	2	15.2	6	46.49	2	16.3	6	7.21	6	75.1	25	13.90	3	93
14.4	36.22	5	15.8	6	46.45	4	16.9	6	7.10	11	77.3	22	13.84	6	95
24.3	36.15	7	16.5	7	46.39	6	17.6	7	6.95	15	79.1	18	13.76	8	96
Dec. 4.3	36.07	8	17.2	7	46.32	7	18.3	7	6.77	18	80.5	14	13.66	10	96
14.3	35.98	9	18.0	8	46.23	9	19.0	7	6.56	21	81.4	9	13.54	12	96
24.3	35.88	10	18.7	7	46.13	10	19.7	7	6.33	23	81.8	4	13.41	13	96
34.2	35.78	10	19.3	6	46.03	10	20.4	7	6.08	25	81.7	1	13.26	15	96
Sec δ, Tan δ	1.003		−0.078		1.003		−0.071		1.678		+1.347		1.196		+
Mean Place	32ˢ.885		36″.25		43ˢ.080		37″.57		3ˢ.748		45″.87		10ˢ.631		66
D′ψ α, Dω α	0.00		+0.01		0.00		0.00		0.00		−0.09		0.00		-
Dψ δ, Dω δ	+0.4		+0.1		+0.4		+0.1		+0.4		+0.1		+0.4		-

FOR THE UPPER TRANSIT AT WASHINGTON.

an Solar Date.	ε Andromedæ. Mag. 4.5				δ Andromedæ. Mag. 3.5				α Cassiopeiæ. Var. 2.2–2.8				μ Phœnicis. Mag. 4.6			
	Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination S.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	0 33		+28 49		0 34		+30 22		0 35		+56 3		0 37		−46 33	
	s		″		s		″		s		″		s		″	
n. 0.2	53.39		69.6		36.38		53.4		29.11		32.0		10.23		83.3	
10.2	53.25	14	69.0	6	36.24	14	52.8	6	28.84	27	31.7	3	10.02	21	83.2	1
20.2	53.12	13	68.0	10	36.10	14	51.9	9	28.56	28	30.9	8	9.82	20	82.7	5
30.2	52.99	13	66.9	11	35.97	13	50.8	11	28.29	27	29.6	13	9.64	18	81.6	11
eb. 9.1	52.87	12	65.6	13	35.85	12	49.5	13	28.05	24	27.9	17	9.48	16	80.1	15
19.1	52.77	10	64.2	14	35.75	10	48.0	15	27.84	21	25.8	21	9.34	14	78.2	19
29.1	52.70	7	62.7	15	35.68	7	46.4	16	27.68	16	23.5	23	9.24	10	76.0	22
ar.10.1	52.67	3	61.3	14	35.64	4	44.9	15	27.58	10	21.1	24	9.18	6	73.4	26
20.0	52.67	0	60.0	13	35.64	0	43.5	14	27.55	3	18.6	25	9.16	2	70.6	28
30.0	52.72	5	58.8	12	35.69	5	42.3	12	27.59	4	16.2	24	9.20	4	67.5	31
pr. 9.0	52.82	10	57.8	10	35.79	10	41.2	11	27.71	12	14.0	22	9.28	8	64.3	32
18.9	52.96	14	57.2	6	35.94	15	40.5	7	27.90	19	12.0	20	9.42	14	61.0	33
28.9	53.15	19	56.9	3	36.13	19	40.1	4	28.16	26	10.3	17	9.61	19	57.7	33
ay 8.9	53.39	24	57.0	1	36.37	24	40.1	0	28.49	33	9.1	12	9.86	25	54.5	32
18.9	53.66	27	57.4	4	36.65	28	40.4	3	28.87	38	8.3	8	10.15	29	51.4	31
28.8	53.97	31	58.1	7	36.96	31	41.2	8	29.30	43	8.1	2	10.48	33	48.4	30
ne 7.8	54.30	33	59.3	12	37.30	34	42.3	11	29.76	46	8.3	2	10.85	37	45.7	27
17.8	54.65	35	60.8	15	37.65	35	43.7	14	30.25	49	9.0	7	11.24	39	43.4	23
27.8	55.01	36	62.5	17	38.01	36	45.4	17	30.74	49	10.2	12	11.65	41	41.4	20
ly 7.7	55.36	35	64.5	20	38.36	35	47.4	20	31.23	49	11.8	16	12.07	42	39.8	16
17.7	55.70	34	66.7	22	38.71	35	49.6	22	31.70	47	13.9	21	12.48	41	38.7	11
27.7	56.02	32	69.1	24	39.04	33	52.0	24	32.15	45	16.3	24	12.87	39	38.1	6
ug. 6.6	56.32	30	71.5	24	39.34	30	54.4	24	32.56	41	19.0	27	13.24	37	38.0	1
16.6	56.59	27	73.9	24	39.61	27	56.9	25	32.93	37	21.9	29	13.57	33	38.4	4
26.6	56.82	23	76.4	25	39.84	23	59.4	25	33.24	31	25.0	31	13.86	29	39.3	9
pt. 5.6	57.01	19	78.8	24	40.04	20	61.9	25	33.50	26	28.3	33	14.10	24	40.6	13
15.5	57.17	16	81.1	23	40.20	16	64.2	23	33.71	21	31.6	33	14.28	18	42.3	17
25.5	57.28	11	83.2	21	40.32	12	66.4	22	33.86	15	34.9	33	14.41	13	44.4	21
ct. 5.5	57.36	8	85.1	19	40.40	8	68.4	20	33.95	9	38.1	32	14.49	8	46.6	22
15.5	57.40	4	86.9	18	40.44	4	70.3	19	33.99	4	41.2	31	14.51	2	49.0	24
25.4	57.41	1	88.4	15	40.45	1	71.9	16	33.97	2	44.1	29	14.48	3	51.4	24
ov. 4.4	57.39	2	89.6	12	40.43	2	73.2	13	33.90	7	46.7	26	14.40	8	53.7	23
14.4	57.34	5	90.6	10	40.38	5	74.3	11	33.78	12	49.0	23	14.28	12	55.8	21
24.3	57.27	7	91.3	7	40.30	8	75.1	8	33.62	16	50.9	19	14.13	15	57.7	19
ec. 4.3	57.17	10	91.8	5	40.21	9	75.6	5	33.43	19	52.4	15	13.96	17	59.3	16
14.3	57.06	11	91.9	1	40.10	11	75.8	2	33.20	23	53.5	11	13.76	20	60.4	11
24.3	56.94	12	91.7	2	39.98	12	75.6	2	32.94	26	54.0	5	13.56	20	61.1	7
34.2	56.81	13	91.2	5	39.84	14	75.2	4	32.67	27	54.0	0	13.36	20	61.3	2
δ, Tan δ	1.142		+0.551		1.159		+0.586		1.791		+1.486		1.455		−1.056	
n Place	54^{s}.131		62″.68		37^{s}.138		45″.98		30^{s}.339		17″.55		10^{s}.086		65″.92	
a, D_ω a	0.00		−0.04		0.00		−0.04		+0.01		−0.10		0.00		+0.07	
, D_ω δ	+0.4		+0.1		+0.4		+0.2		+0.4		+0.2		+0.4		+0.2	

Mean Solar Date.	**β Ceti.** Mag. 2.2				**ο Cassiopeiæ.** Mag. 4.7				**21 Cassiopeiæ.** Mag. 5.6				**ζ Andromedæ.** Mag. 4.3			
	Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination N.	
	h m 0 39		° ′ −18 27		h m 0 39		° ′ +47 48		h m 0 39		° ′ +74 30		h m 0 42		° ′ +23 47	
	s		″		s		″		s		″		s		″	
Jan. 0.3	10.14		79.1		47.97		23.3		46.74		43.8		39.64		24.6	
10.2	10.03	11	79.6	5	47.76	21	22.9	4	46.03	71	43.9	1	39.52	12	24.0	6
20.2	9.91	12	79.8	2	47.55	21	22.0	9	45.32	71	43.4	5	39.39	13	23.2	8
30.2	9.80	11	79.7	1	47.34	21	20.8	12	44.64	68	42.3	11	39.27	12	22.2	10
Feb. 9.1	9.71	9	79.3	4	47.15	19	19.2	16	44.02	62	40.6	17	39.16	11	21.1	11
19.1	9.63	8	78.7	6	46.99	16	17.3	19	43.48	54	38.5	21	39.06	10	19.9	12
29.1	9.57	6	77.8	9	46.87	12	15.3	20	43.05	43	36.0	25	38.99	7	18.6	13
Mar. 10.1	9.54	3	76.7	11	46.80	7	13.1	22	42.75	30	33.3	27	38.95	4	17.5	11
20.0	9.55	1	75.3	14	46.78	2	10.9	22	42.59	16	30.4	29	38.95	0	16.4	11
30.0	9.59	4	73.6	17	46.81	3	8.8	21	42.59	0	27.5	29	38.99	4	15.5	9
Apr. 9.0	9.67	8	71.8	18	46.91	10	6.9	19	42.74	15	24.7	28	39.08	9	14.9	6
19.0	9.80	13	69.7	21	47.07	16	5.3	16	43.05	31	22.0	27	39.21	13	14.5	4
28.9	9.96	16	67.4	23	47.30	23	4.0	13	43.50	45	19.7	23	39.39	18	14.4	1
May 8.9	10.17	21	65.1	23	47.58	28	3.1	9	44.08	58	17.8	19	39.61	22	14.7	3
18.9	10.42	25	62.7	24	47.91	33	2.6	5	44.78	70	16.4	14	39.87	26	15.3	6
28.8	10.70	28	60.2	25	48.28	37	2.6	0	45.56	78	15.4	10	40.16	29	16.3	10
June 7.8	11.00	30	57.8	24	48.68	40	3.1	5	46.41	85	15.0	4	40.48	32	17.5	12
17.8	11.32	32	55.5	23	49.10	42	4.0	9	47.30	89	15.2	2	40.82	34	19.1	16
27.8	11.65	33	53.3	22	49.53	43	5.3	13	48.21	91	15.9	7	41.16	34	20.9	18
July 7.7	11.98	33	51.3	20	49.96	43	7.0	17	49.12	91	17.1	12	41.50	34	22.9	20
17.7	12.31	33	49.6	17	50.38	42	9.1	21	49.99	87	18.8	17	41.84	34	25.0	21
27.7	12.63	32	48.2	14	50.77	39	11.5	24	50.81	82	21.0	22	42.16	32	27.3	23
Aug. 6.7	12.92	29	47.1	11	51.13	36	14.1	26	51.57	76	23.6	26	42.46	30	29.6	23
16.6	13.18	26	46.4	7	51.46	33	17.0	29	52.25	68	26.5	29	42.73	27	31.9	23
26.6	13.41	23	46.0	4	51.74	28	19.9	29	52.84	59	29.7	32	42.96	23	34.1	22
Sept. 5.6	13.60	19	45.9	1	51.98	24	22.9	30	53.32	48	33.2	35	43.15	19	36.2	21
15.5	13.76	16	46.2	3	52.17	19	26.0	31	53.69	37	36.9	37	43.31	16	38.2	20
25.5	13.87	11	46.8	6	52.31	14	29.0	30	53.95	26	40.6	37	43.43	12	40.1	19
Oct. 5.5	13.95	8	47.7	9	52.40	9	31.9	29	54.09	14	44.3	37	43.52	9	41.8	17
15.5	13.99	4	48.7	10	52.45	5	34.6	27	54.11	2	48.0	37	43.58	6	43.2	14
25.4	14.00	1	49.9	12	52.45	0	37.1	25	54.01	10	51.6	36	43.60	2	44.4	12
Nov. 4.4	13.98	2	51.2	13	52.41	4	39.4	23	53.79	22	54.9	33	43.59	1	45.4	10
14.4	13.93	5	52.5	13	52.33	8	41.3	19	53.47	32	57.9	30	43.55	4	46.2	8
24.4	13.86	7	53.7	12	52.22	11	42.9	16	53.04	43	60.5	26	43.49	6	46.7	5
Dec. 4.3	13.78	8	54.9	12	52.08	14	44.2	13	52.53	51	62.7	22	43.42	7	47.0	3
14.3	13.68	10	55.9	10	51.91	17	45.0	8	51.94	59	64.3	16	43.32	10	47.0	0
24.3	13.57	11	56.7	8	51.72	19	45.3	3	51.28	66	65.4	11	43.21	11	46.8	2
34.2	13.46	11	57.3	6	51.52	20	45.2	1	50.59	69	65.9	5	43.09	12	46.3	5
Sec δ, Tan δ	1.054		−0.334		1.489		+1.103		3.745		+3.609		1.093		+0.441	
Mean Place	10^{s}.381		69″.82		48^{s}.961		10″.61		48^{s}.984		26″.07		40^{s}.273		19″.04	
D′ψ α, Dω α	0.00		+0.02		+0.01		−0.07		+0.02		−0.24		0.00		−0.03	
Dψ δ, Dω δ	+0.4		+0.2		+0.4		+0.2		+0.4		+0.2		+0.4		+0.2	

Mean Solar Date.	η Cassiopeiæ. Mag. 3.6				δ Piscium. Mag. 4.6				λ Hydri. Mag. 5.0				20 Ceti. Mag. 4.9			
	Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination S.	
	h m 0 43		° ′ +57 20		h m 0 44		° ′ + 7 6		h m 0 45		° ′ −75 23		h m 0 48		° ′ − 1 36	
	s		″		s		″		s		″		s		″	
Jan. 0.3	44.95		74.6		6.46		22.6		34.64		89.3		30.21		81.6	
10.2	44.66	29	74.4	2	6.36	10	22.0	6	33.86	78	88.6	7	30.10	11	82.2	6
20.2	44.37	29	73.6	8	6.25	11	21.3	7	33.12	74	87.3	13	29.99	11	82.7	5
30.2	44.09	28	72.4	12	6.15	10	20.7	6	32.43	69	85.5	18	29.89	10	83.2	5
Feb. 9.1	43.83	26	70.8	16	6.05	10	20.1	6	31.81	62	83.2	23	29.80	9	83.5	3
19.1	43.61	22	68.8	20	5.97	8	19.5	6	31.28	53	80.4	28	29.72	8	83.7	2
29.1	43.44	17	66.5	23	5.91	6	19.1	4	30.85	43	77.2	32	29.66	6	83.7	0
Mar. 10.1	43.32	12	64.1	24	5.88	3	18.8	3	30.53	32	73.7	35	29.63	3	83.5	2
20.0	43.27	5	61.6	25	5.89	1	18.7	1	30.33	20	70.0	37	29.62	1	83.1	4
30.0	43.30	3	59.1	25	5.93	4	18.8	1	30.26	7	66.2	38	29.65	3	82.4	7
Apr. 9.0	43.41	11	56.8	23	6.01	8	19.1	3	30.33	7	62.3	39	29.73	8	81.5	9
19.0	43.59	18	54.7	21	6.13	12	19.7	6	30.53	20	58.4	39	29.84	11	80.4	11
28.9	43.85	26	53.0	17	6.30	17	20.6	9	30.86	33	54.7	37	30.00	16	79.1	13
May 8.9	44.18	33	51.6	14	6.50	20	21.7	11	31.32	46	51.1	36	30.20	20	77.5	16
18.9	44.57	39	50.7	9	6.74	24	23.1	14	31.90	58	47.8	33	30.44	24	75.7	18
28.8	45.01	44	50.3	4	7.02	28	24.7	16	32.59	69	44.8	30	30.71	27	73.8	19
June 7.8	45.49	48	50.4	1	7.32	30	26.5	18	33.36	77	42.2	26	31.00	29	71.7	21
17.8	45.99	50	51.0	6	7.63	31	28.5	20	34.21	85	40.1	21	31.31	31	69.6	21
27.8	46.50	51	52.0	10	7.95	32	30.5	20	35.11	90	38.5	16	31.63	32	67.5	21
July 7.7	47.01	51	53.5	15	8.28	33	32.6	21	36.04	93	37.5	10	31.95	32	65.4	21
17.7	47.51	50	55.4	19	8.60	32	34.6	20	36.97	93	37.0	5	32.27	32	63.4	20
27.7	47.98	47	57.7	23	8.90	30	36.6	20	37.88	91	37.1	1	32.57	30	61.6	18
Aug. 6.7	48.41	43	60.3	26	9.18	28	38.5	19	38.73	85	37.8	7	32.86	29	60.0	16
16.6	48.80	39	63.2	29	9.44	26	40.3	18	39.50	77	39.0	12	33.12	26	58.5	15
26.6	49.14	34	66.3	31	9.67	23	41.9	16	40.17	67	40.8	18	33.34	22	57.3	12
Sept. 5.6	49.43	29	69.5	32	9.86	19	43.2	13	40.73	56	43.0	22	33.53	19	56.4	9
15.5	49.66	23	72.8	33	10.01	15	44.3	11	41.15	42	45.6	26	33.69	16	55.8	6
25.5	49.84	18	76.1	33	10.13	12	45.2	9	41.42	27	48.4	28	33.82	13	55.4	4
Oct. 5.5	49.95	11	79.4	33	10.22	9	45.9	7	41.53	11	51.4	30	33.91	9	55.2	2
15.5	50.00	5	82.5	31	10.27	5	46.4	5	41.48	5	54.4	30	33.96	5	55.3	1
25.4	50.00	0	85.4	29	10.29	2	46.7	3	41.27	21	57.4	30	33.98	2	55.6	3
Nov. 4.4	49.95	5	88.1	27	10.29	0	46.7	0	40.92	35	60.2	28	33.98	0	56.0	4
14.4	49.84	11	90.5	24	10.26	3	46.6	1	40.44	48	62.6	24	33.95	3	56.6	6
24.4	49.69	15	92.5	20	10.21	5	46.3	3	39.85	59	64.6	20	33.90	5	57.2	6
Dec. 4.3	49.50	19	94.1	16	10.14	7	45.9	4	39.18	67	66.1	15	33.84	6	57.9	7
14.3	49.27	23	95.3	12	10.05	9	45.4	5	38.44	74	67.0	9	33.76	8	58.6	7
24.3	49.01	26	96.0	7	9.96	9	44.9	5	37.67	77	67.4	4	33.66	10	59.3	7
34.2	48.73	28	96.1	1	9.86	10	44.3	6	36.89	78	67.2	2	33.56	10	59.9	6
Sec δ, Tan δ	1.854		+1.561		1.008		+0.125		3.968		−3.839		1.000		−0.028	
Mean Place	$46^{s}.125$		59″.54		$6^{s}.921$		22″.84		$32^{s}.752$		67″.82		$30^{s}.554$		78″.43	
$D'_{\psi}\alpha$, $D_{\omega}\alpha$	+0.01		−0.10		0.00		−0.01		−0.02		+0.26		0.00		0.00	
$D_{\psi}\delta$, $D_{\omega}\delta$	+0.4		+0.2		+0.4		+0.2		+0.4		+0.2		+0.4		+0.2	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	**γ Cassiopeiæ.** Mag. 2.2				**μ Andromedæ.** Mag. 3.9				**α Sculptoris.** Mag. 4.4				**ε Piscium.** Mag. 4.4			
	Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination N.	
	h m 0 51		° ′ +60 14		h m 0 51		° ′ +38 1		h m 0 54		° ′ −29 49		h m 0 58		° ′ + 7 24	
	s		″		s		″		s		″		s		″	
Jan. 0.3	22.06		41.4		51.12		30.3		21.92		71.4		22.10		60.0	
10.2	21.73	33	41.4	0	50.95	17	29.9	4	21.78	14	71.7	3	21.99	11	59.4	6
20.2	21.40	33	40.8	6	50.79	16	29.2	7	21.64	14	71.7	0	21.88	11	58.8	6
30.2	21.08	32	39.7	11	50.63	16	28.1	11	21.50	14	71.4	3	21.77	11	58.1	7
Feb. 9.2	20.78	30	38.1	16	50.47	16	26.7	14	21.38	12	70.7	7	21.67	10	57.5	6
19.1	20.52	26	36.2	19	50.34	13	25.2	15	21.27	11	69.6	11	21.58	9	57.0	5
29.1	20.31	21	34.0	22	50.24	10	23.5	17	21.18	9	68.2	14	21.51	7	56.6	4
Mar. 10.1	20.16	15	31.5	25	50.17	7	21.7	18	21.13	5	66.5	17	21.47	4	56.3	3
20.0	20.09	7	28.9	26	50.15	2	20.0	17	21.11	2	64.5	20	21.46	1	56.2	1
30.0	20.10	1	26.4	25	50.18	3	18.4	16	21.13	2	62.2	23	21.48	2	56.3	1
Apr. 9.0	20.19	9	24.0	24	50.26	8	16.9	15	21.19	6	59.8	24	21.55	7	56.6	3
19.0	20.37	18	21.8	22	50.39	13	15.7	12	21.30	11	57.2	26	21.66	11	57.2	6
28.9	20.63	26	19.9	19	50.58	19	14.9	8	21.45	15	54.4	28	21.81	15	58.0	8
May 8.9	20.96	33	18.4	15	50.82	24	14.4	5	21.65	20	51.6	28	22.00	19	59.1	11
18.9	21.36	40	17.3	11	51.10	28	14.3	1	21.89	24	48.8	28	22.23	23	60.4	13
28.9	21.82	46	16.7	6	51.43	33	14.6	3	22.17	28	46.0	28	22.50	27	62.0	16
June 7.8	22.32	50	16.6	1	51.78	35	15.2	6	22.47	30	43.3	27	22.79	29	63.7	17
17.8	22.85	53	17.0	4	52.15	37	16.3	11	22.80	33	40.8	25	23.10	31	65.6	19
27.8	23.39	54	17.9	9	52.53	38	17.8	15	23.15	35	38.6	22	23.42	32	67.6	20
July 7.7	23.94	55	19.3	14	52.92	39	19.5	17	23.50	35	36.6	20	23.75	33	69.7	21
17.7	24.47	53	21.1	18	53.29	37	21.6	21	23.85	35	35.0	16	24.07	32	71.7	20
27.7	24.97	50	23.3	22	53.65	36	23.9	23	24.19	34	33.8	12	24.38	31	73.7	20
Aug. 6.7	25.44	47	25.9	26	53.98	33	26.3	24	24.50	31	33.0	8	24.67	29	75.6	19
16.6	25.87	43	28.7	28	54.28	30	28.9	26	24.79	29	32.7	3	24.93	26	77.3	17
26.6	26.24	37	31.8	31	54.55	27	31.5	26	25.05	26	32.8	1	25.17	24	78.9	16
Sept. 5.6	26.56	32	35.0	32	54.78	23	34.2	27	25.27	22	33.2	4	25.37	20	80.3	14
15.6	26.81	25	38.3	33	54.97	19	36.8	26	25.45	18	34.1	9	25.54	17	81.4	11
25.5	27.01	20	41.7	34	55.12	15	39.4	26	25.58	13	35.3	12	25.67	13	82.3	9
Oct. 5.5	27.14	13	45.1	34	55.22	10	41.8	24	25.68	10	36.8	15	25.77	10	83.0	7
15.5	27.21	7	48.3	32	55.29	7	44.0	22	25.73	5	38.4	16	25.83	6	83.5	5
25.4	27.21	0	51.4	31	55.32	3	46.1	21	25.74	1	40.2	18	25.87	4	83.7	2
Nov. 4.4	27.16	5	54.3	29	55.31	1	47.9	18	25.72	2	42.1	19	25.88	1	83.8	1
14.4	27.05	11	56.8	25	55.27	4	49.4	15	25.67	5	43.8	17	25.86	2	83.7	1
24.4	26.88	17	59.0	22	55.20	7	50.6	12	25.59	8	45.5	17	25.82	4	83.5	2
Dec. 4.3	26.67	21	60.8	18	55.10	10	51.5	9	25.49	10	47.0	15	25.76	6	83.1	4
14.3	26.42	25	62.2	14	54.98	12	52.1	6	25.37	12	48.2	12	25.69	7	82.7	4
24.3	26.13	29	63.0	8	54.84	14	52.3	2	25.24	13	49.2	10	25.60	9	82.1	6
34.3	25.82	31	63.3	3	54.69	15	52.1	2	25.10	14	49.8	6	25.50	10	81.5	6
Sec δ, Tan δ	2.015		+1.749		1.269		+0.782		1.153		−0.573		1.008		+0.130	
Mean Place	$23^{s}.243$		$25''.56$		$51^{s}.855$		$19''.99$		$21^{s}.918$		$59''.04$		$22^{s}.474$		$59''.64$	
$D'_{\psi}\alpha$, $D_{\omega}\alpha$	+0.01		−0.11		0.00		−0.05		0.00		+0.04		0.00		−0.01	
$D_{\psi}\delta$, $D_{\omega}\delta$	+0.4		+0.2		+0.4		+0.2		+0.4		+0.2		+0.4		+0.3	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	β Phœnicis. Mag. 3.4				μ Cassiopeiæ. Mag. 5.3				η Ceti. Mag. 3.6				β Andromedæ. Mag. 2.4			
	Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination N.	
	h m 1 2		° ′ −47 10		h m 1 2		° ′ +54 29		h m 1 4		° ′ −10 38		h m 1 4		° ′ +35 9	
	s		″		s		″		s		″		s		″	
Jan. 0.3	9.79		101.0		23.44		36.0		9.61		60.1		47.40		25.1	
10.2	9.57	22	101.2	2	23.19	25	35.9	1	9.50	11	60.7	6	47.25	15	24.8	3
20.2	9.36	21	100.9	3	22.93	26	35.3	6	9.39	11	61.1	4	47.09	16	24.1	7
30.2	9.15	21	100.1	8	22.68	25	34.3	10	9.27	12	61.4	3	46.93	16	23.1	10
Feb. 9.2	8.96	19	98.8	13	22.44	24	32.8	15	9.17	10	61.4	0	46.78	15	21.9	12
19.1	8.79	17	97.0	18	22.23	21	31.0	18	9.08	9	61.2	2	46.65	13	20.5	14
29.1	8.65	14	94.9	21	22.06	17	28.9	21	9.00	8	60.7	5	46.54	11	19.0	15
Mar. 10.1	8.55	10	92.4	25	21.94	12	26.6	23	8.95	5	60.1	6	46.47	7	17.4	16
20.0	8.49	6	89.6	28	21.88	6	24.2	24	8.93	2	59.2	9	46.44	3	15.8	16
30.0	8.48	1	86.6	30	21.89	1	21.9	23	8.95	2	58.0	12	46.45	1	14.3	15
Apr. 9.0	8.53	5	83.4	32	21.97	8	19.6	23	9.00	5	56.6	14	46.51	6	13.0	13
19.0	8.63	10	80.1	33	22.13	16	17.6	20	9.10	10	54.9	17	46.63	12	12.0	10
28.9	8.78	15	76.7	34	22.36	23	15.8	18	9.24	14	53.1	18	46.80	17	11.2	8
May 8.9	8.99	21	73.3	34	22.65	29	14.4	14	9.43	19	51.1	20	47.02	22	10.8	4
18.9	9.25	26	70.0	33	23.01	36	13.4	10	9.65	22	48.9	22	47.29	27	10.7	1
28.9	9.56	31	66.9	31	23.41	40	12.9	5	9.91	26	46.7	22	47.59	30	11.0	3
June 7.8	9.91	35	64.0	29	23.86	45	12.9	0	10.19	28	44.4	23	47.93	34	11.7	7
17.8	10.29	38	61.5	25	24.34	48	13.3	4	10.50	31	42.1	23	48.29	36	12.8	11
27.8	10.69	40	59.3	22	24.83	49	14.2	9	10.82	32	39.9	22	48.66	37	14.2	14
July 7.7	11.10	41	57.5	18	25.32	49	15.5	13	11.14	32	37.8	21	49.04	38	15.9	17
17.7	11.52	42	56.2	13	25.81	49	17.2	17	11.47	33	35.9	19	49.41	37	17.8	19
27.7	11.92	40	55.3	9	26.27	46	19.3	21	11.78	31	34.2	17	49.76	35	20.0	22
Aug. 6.7	12.30	38	55.0	3	26.71	44	21.7	24	12.07	29	32.8	14	50.10	34	22.3	23
16.6	12.66	36	55.3	3	27.11	40	24.4	27	12.34	27	31.7	11	50.40	30	24.8	25
26.6	12.97	31	56.0	7	27.47	36	27.2	28	12.59	25	30.9	8	50.67	27	27.3	25
Sept. 5.6	13.24	27	57.2	12	27.78	31	30.2	30	12.80	21	30.4	5	50.91	24	29.8	25
15.6	13.46	22	58.8	16	28.04	26	33.3	31	12.97	17	30.3	1	51.11	20	32.2	24
25.5	13.62	16	60.8	20	28.25	21	36.5	32	13.11	14	30.4	1	51.27	16	34.6	24
Oct. 5.5	13.72	10	63.0	22	28.40	15	39.5	30	13.21	10	30.8	4	51.39	12	36.8	22
15.5	13.78	6	65.4	24	28.50	10	42.5	30	13.28	7	31.5	7	51.47	8	38.9	21
25.4	13.78	0	68.0	26	28.54	4	45.4	29	13.32	4	32.3	8	51.52	5	40.8	19
Nov. 4.4	13.73	5	70.4	24	28.54	0	48.0	26	13.32	0	33.2	9	51.53	1	42.5	17
14.4	13.63	10	72.8	24	28.48	6	50.3	23	13.30	2	34.2	10	51.51	2	43.9	14
24.4	13.50	13	74.9	21	28.38	10	52.3	20	13.26	4	35.3	11	51.46	5	45.0	11
Dec. 4.3	13.34	16	76.7	18	28.25	13	53.9	16	13.20	6	36.4	11	51.38	8	45.9	9
14.3	13.15	19	78.1	14	28.07	18	55.1	12	13.12	8	37.3	9	51.28	10	46.4	5
24.3	12.95	20	79.0	9	27.86	21	55.8	7	13.02	10	38.2	9	51.15	13	46.6	2
34.3	12.74	21	79.6	6	27.62	24	56.0	2	12.92	10	38.9	7	51.01	14	46.4	2
Sec δ, Tan δ	1.472		−1.080		1.722		+1.402		1.018		−0.188		1.223		+0.704	
Mean Place	$9^{s}.407$		$84''.48$		$24^{s}.358$		$21''.00$		$9^{s}.775$		$54''.34$		$48^{s}.009$		$15''.21$	
$D'_{\psi}\alpha$, $D_{\omega}\alpha$	−0.01		+0.07		+0.01		−0.09		0.00		+0.01		+0.01		−0.05	
$D_{\psi}\delta$, $D_{\omega}\delta$	+0.4		+0.3		+0.4		+0.3		+0.4		+0.3		+0.4		+0.3	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	τ Piscium. Mag. 4.7				ζ Piscium. Mag. 5.6				κ Tucanæ. Mag. 5.0				*f* Piscium. Mag. 5.3			
	Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination N.	
	h m 1 6		° ′ +29 37		h m 1 9		° ′ + 7 6		h m 1 12		° ′ −69 20		h m 1 13		° + 3	
	s		″		s		″		s		″		s		″	
Jan. 0.3	48.07		29.9		7.63		37.6		48.75		56.6		15.28		4.0	
10.2	47.93	14	29.5	4	7.52	11	37.0	6	48.22	53	56.5	1	15.17	11	3.4	
20.2	47.79	14	28.9	6	7.41	11	36.4	6	47.70	52	55.7	8	15.06	11	2.8	
30.2	47.65	14	28.0	9	7.30	11	35.8	6	47.19	51	54.4	13	14.95	11	2.3	
Feb. 9.2	47.52	13	26.9	11	7.19	11	35.2	6	46.72	47	52.5	19	14.84	11	1.9	
19.1	47.39	13	25.6	13	7.10	9	34.7	5	46.30	42	50.2	23	14.74	10	1.5	
29.1	47.29	10	24.3	13	7.02	8	34.3	4	45.94	36	47.4	28	14.66	8	1.3	
Mar. 10.1	47.23	6	22.9	14	6.96	6	34.0	3	45.65	29	44.2	32	14.61	5	1.2	
20.1	47.20	3	21.6	13	6.94	2	33.9	1	45.45	20	40.8	34	14.58	3	1.4	
30.0	47.21	1	20.4	12	6.96	2	34.0	1	45.34	11	37.2	36	14.59	1	1.7	
Apr. 9.0	47.27	6	19.4	10	7.01	5	34.3	3	45.32	2	33.4	38	14.64	5	2.3	
19.0	47.38	11	18.7	7	7.11	10	34.9	6	45.40	8	29.5	39	14.73	9	3.1	
28.9	47.54	16	18.2	5	7.26	15	35.8	9	45.58	18	25.7	38	14.87	14	4.1	
May 8.9	47.75	21	18.1	1	7.44	18	36.9	11	45.86	28	22.0	37	15.05	18	5.4	
18.9	48.01	26	18.3	2	7.66	22	38.2	13	46.23	37	18.5	35	15.27	22	7.0	
28.9	48.30	29	18.8	5	7.92	26	39.7	15	46.69	46	15.3	32	15.52	25	8.7	
June 7.8	48.62	32	19.7	9	8.21	29	41.4	17	47.23	54	12.4	29	15.80	28	10.5	
17.8	48.96	34	21.0	13	8.52	31	43.3	19	47.83	60	9.9	25	16.10	30	12.5	20
27.8	49.31	35	22.5	15	8.84	32	45.3	20	48.47	64	7.8	21	16.42	32	14.5	20
July 7.8	49.66	35	24.2	17	9.16	32	47.3	20	49.15	68	6.3	15	16.74	32	16.6	21
17.7	50.02	36	26.2	20	9.48	32	49.3	20	49.84	69	5.3	10	17.06	32	18.6	20
27.7	50.37	35	28.4	22	9.79	31	51.3	20	50.52	68	4.9	4	17.37	31	20.5	19
Aug. 6.7	50.69	32	30.7	23	10.09	30	53.2	19	51.18	66	5.1	2	17.67	30	22.2	17
16.6	50.98	29	33.0	23	10.36	27	54.9	17	51.79	61	5.9	8	17.94	27	23.8	16
26.6	51.24	26	35.3	23	10.60	24	56.5	16	52.34	55	7.2	13	18.18	24	25.2	14
Sept. 5.6	51.47	23	37.6	23	10.81	21	57.8	13	52.81	47	9.0	18	18.40	22	26.4	12
15.6	51.66	19	39.8	22	10.99	18	58.9	11	53.19	38	11.3	23	18.58	18	27.3	9
25.5	51.82	16	41.9	21	11.14	15	59.8	9	53.46	27	13.9	26	18.73	15	27.9	6
Oct. 5.5	51.94	12	43.8	19	11.25	11	60.4	6	53.63	17	16.8	29	18.84	11	28.3	4
15.5	52.02	8	45.6	18	11.33	8	60.8	4	53.69	6	19.8	30	18.92	8	28.5	2
25.5	52.07	5	47.2	16	11.38	5	61.0	2	53.63	6	22.8	30	18.97	5	28.5	0
Nov. 4.4	52.09	2	48.6	14	11.40	2	61.1	1	53.47	16	25.7	29	18.99	2	28.3	
14.4	52.07	2	49.7	11	11.39	1	61.0	1	53.22	25	28.4	27	18.99	0	28.0	
24.4	52.03	4	50.6	9	11.36	3	60.8	2	52.88	34	30.8	24	18.96	3	27.5	
Dec. 4.3	51.96	7	51.2	6	11.30	6	60.4	4	52.46	42	32.7	19	18.91	5	27.0	
14.3	51.87	9	51.5	3	11.23	7	59.9	5	51.99	47	34.1	14	18.84	7	26.4	
24.3	51.76	11	51.5	0	11.15	8	59.4	5	51.49	50	34.9	8	18.76	8	25.8	
34.3	51.64	12	51.3	2	11.05	10	58.8	6	50.96	53	35.2	3	18.66	10	25.1	
Sec δ, Tan δ	1.150		+0.569		1.008		+0.125		2.835		−2.652		1.001		+0.055	
Mean Place	48ˢ.605		21″.71		7ˢ.938		36″.94		47ˢ.111		36″.92		15ˢ.525		4″.65	
D′ψ α, Dω α	0.00		−0.04		0.00		−0.01		−0.02		+0.18		0.00		0.00	
Dψ δ, Dω δ	+0.4		+0.3		+0.4		+0.3		+0.4		+0.3		+0.4		+0.3	

Mean Solar Date.	υ Piscium. Mag. 4.7				θ Ceti. Mag. 3.8				δ Cassiopeiæ. Mag. 2.8				γ Phœnicis. Mag. 3.4			
	Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination S.	
	h m 1 14		° ′ +26 48		h m 1 19		° ′ − 8 37		h m 1 19		° ′ +59 46		h m 1 24		° ′ −43 45	
	s		″		s		″		s		″		s		″	
Jan. 0.3	37.11		14.0		37.36		78.3		62.10		58.8		33.16		83.3	
10.3	36.98	13	13.6	4	37.25	11	79.0	7	61.79	31	59.1	3	32.96	20	83.8	5
20.2	36.85	13	13.0	6	37.14	11	79.5	5	61.47	32	58.8	3	32.76	20	83.8	0
30.2	36.71	14	12.1	9	37.02	12	79.8	3	61.14	33	58.1	7	32.55	21	83.3	5
Feb. 9.2	36.58	13	11.1	10	36.91	11	79.9	1	60.83	31	56.9	12	32.36	19	82.3	10
19.1	36.46	12	10.0	11	36.80	11	79.8	1	60.54	29	55.2	17	32.18	18	80.9	14
29.1	36.36	10	8.8	12	36.71	9	79.5	3	60.30	24	53.2	20	32.03	15	79.1	18
Mar. 10.1	36.29	7	7.6	12	36.65	6	78.9	6	60.12	18	51.0	22	31.91	12	76.9	22
20.1	36.25	4	6.4	12	36.62	3	78.1	8	60.00	12	48.6	24	31.83	8	74.3	26
30.0	36.25	0	5.4	10	36.62	0	77.1	10	59.95	5	46.1	25	31.79	4	71.5	28
Apr. 9.0	36.30	5	4.6	8	36.66	4	75.8	13	59.99	4	43.7	24	31.80	1	68.5	30
19.0	36.41	11	4.0	6	36.74	8	74.3	15	60.12	13	41.4	23	31.87	7	65.3	32
29.0	36.56	15	3.6	4	36.87	13	72.6	17	60.34	22	39.4	20	31.99	12	62.0	33
May 8.9	36.76	20	3.6	0	37.04	17	70.7	19	60.63	29	37.7	17	32.16	17	58.6	34
18.9	37.00	24	3.9	3	37.25	21	68.7	20	60.99	36	36.4	13	32.39	23	55.4	32
28.9	37.28	28	4.6	7	37.49	24	66.5	22	61.42	43	35.6	8	32.66	27	52.2	32
June 7.8	37.59	31	5.6	10	37.77	28	64.3	22	61.89	47	35.2	4	32.97	31	49.2	30
17.8	37.92	33	6.8	12	38.07	30	62.0	23	62.40	51	35.3	1	33.32	35	46.5	27
27.8	38.26	34	8.3	15	38.38	31	59.8	22	62.94	54	35.9	6	33.69	37	44.1	24
July 7.8	38.61	35	10.1	18	38.70	32	57.7	21	63.48	54	36.9	10	34.08	39	42.0	21
17.7	38.96	35	12.1	20	39.02	32	55.8	19	64.03	55	38.3	14	34.48	40	40.4	16
27.7	39.30	34	14.2	21	39.33	31	54.0	18	64.56	53	40.2	19	34.86	38	39.3	11
Aug. 6.7	39.62	32	16.3	21	39.63	30	52.5	15	65.06	50	42.4	22	35.24	38	38.7	6
16.7	39.92	30	18.5	22	39.91	28	51.3	12	65.52	46	45.0	26	35.58	34	38.7	0
26.6	40.18	26	20.7	22	40.16	25	50.4	9	65.93	41	47.8	28	35.90	32	39.1	4
Sept. 5.6	40.41	23	22.9	22	40.38	22	49.8	6	66.30	37	50.8	30	36.18	28	40.0	9
15.6	40.61	20	25.0	21	40.57	19	49.5	3	66.61	31	54.0	32	36.41	23	41.4	14
25.5	40.77	16	26.9	19	40.72	15	49.6	1	66.87	26	57.2	32	36.60	19	43.2	18
Oct. 5.5	40.90	13	28.7	18	40.84	12	49.9	3	67.06	19	60.5	33	36.73	13	45.2	20
15.5	40.99	9	30.3	16	40.92	8	50.4	5	67.19	13	63.7	32	36.81	8	47.6	24
25.5	41.05	6	31.7	14	40.98	6	51.1	7	67.26	7	66.8	31	36.85	4	50.0	24
Nov. 4.4	41.07	2	32.9	12	41.00	2	52.0	9	67.27	1	69.7	29	36.83	2	52.5	25
14.4	41.07	0	33.9	10	40.99	1	53.0	10	67.22	5	72.4	27	36.78	5	54.9	24
24.4	41.04	3	34.6	7	40.96	3	54.0	10	67.12	10	74.8	24	36.68	10	57.2	23
Dec. 4.4	40.98	6	35.1	5	40.91	5	55.0	10	66.96	16	76.8	20	36.56	12	59.1	19
14.3	40.90	8	35.4	3	40.84	7	56.0	10	66.75	21	78.4	16	36.40	16	60.7	16
24.3	40.80	10	35.4	0	40.75	9	56.8	8	66.49	26	79.5	11	36.22	18	62.0	13
34.3	40.68	12	35.2	2	40.65	10	57.6	8	66.21	28	80.1	6	36.03	19	62.8	8
Sec δ, Tan δ	1.120		+0.505		1.012		−0.152		1.987		+1.717		1.385		−0.958	
Mean Place	$37^{\mathrm{s}}.566$		6″.47		$37^{\mathrm{s}}.455$		73″.83		$62^{\mathrm{s}}.942$		42″.30		$32^{\mathrm{s}}.676$		68″.58	
$D'_{\psi}\alpha$, $D_{\omega}\alpha$	0.00		−0.03		0.00		+0.01		+0.02		−0.11		−0.01		+0.06	
$D_{\psi}\delta$, $D_{\omega}\delta$	+0.4		+0.3		+0.4		+0.3		+0.4		+0.3		+0.4		+0.4	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	38 Cassiopeiæ. Mag. 6.0				η Piscium. Mag. 3.7				40 Cassiopeiæ. Mag. 5.5				υ Andromedæ. Mag. 4.2			
	Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination N.	
	h m 1 24		° ′ +69 48		h m 1 26		° ′ +14 53		h m 1 31		° ′ +72 35		h m 1 31		° ′ +40 57	
	s		″		s		″		s		″		s		″	
Jan. 0.3	38.67		62.1		46.03		36.9		26.59		50.1		37.12		68.7	
10.3	38.18	49	62.7	6	45.92	11	36.4	5	26.01	58	50.9	8	36.96	16	68.7	0
20.2	37.66	52	62.7	0	45.80	12	35.8	6	25.39	62	51.0	1	36.78	18	68.3	4
30.2	37.14	52	62.1	6	45.68	12	35.1	7	24.77	62	50.6	4	36.59	19	67.5	8
Feb. 9.2	36.63	51	61.0	11	45.56	12	34.4	7	24.17	60	49.6	10	36.41	18	66.5	10
19.1	36.17	46	59.4	16	45.45	11	33.7	7	23.61	56	48.0	16	36.24	17	65.2	13
29.1	35.77	40	57.4	20	45.35	10	33.0	7	23.12	49	46.0	20	36.09	15	63.6	16
Mar. 10.1	35.45	32	55.0	24	45.28	7	32.4	6	22.73	39	43.7	23	35.98	11	61.9	17
20.1	35.24	21	52.4	26	45.24	4	31.9	5	22.46	27	41.1	26	35.91	7	60.2	17
30.0	35.14	10	49.6	28	45.24	0	31.5	4	22.31	15	38.4	27	35.88	3	58.5	17
Apr. 9.0	35.16	2	46.9	27	45.28	4	31.4	1	22.30	1	35.6	28	35.91	3	56.9	16
19.0	35.30	14	44.3	26	45.36	8	31.5	1	22.44	14	32.9	27	36.00	9	55.5	14
29.0	35.56	26	41.9	24	45.49	13	31.8	3	22.71	27	30.4	25	36.15	15	54.3	12
May 8.9	35.94	38	39.8	21	45.66	17	32.4	6	23.11	40	28.1	23	36.36	21	53.4	9
18.9	36.42	48	38.1	17	45.88	22	33.3	9	23.64	53	26.2	19	36.62	26	52.9	5
28.9	36.99	57	36.8	13	46.14	26	34.4	11	24.27	63	24.8	14	36.92	30	52.8	1
June 7.8	37.63	64	36.0	8	46.42	28	35.8	14	24.98	71	23.9	9	37.26	34	53.0	2
17.8	38.32	69	35.7	3	46.73	31	37.4	16	25.75	77	23.4	5	37.63	37	53.6	6
27.8	39.05	73	36.0	3	47.05	32	39.2	18	26.57	82	23.4	0	38.02	39	54.6	10
July 7.8	39.80	75	36.7	7	47.38	33	41.1	19	27.41	84	24.0	6	38.41	39	56.0	14
17.7	40.54	74	37.9	12	47.71	33	43.0	19	28.26	85	25.1	11	38.81	40	57.6	16
27.7	41.26	72	39.6	17	48.03	32	45.0	20	29.09	83	26.6	15	39.20	39	59.5	19
Aug. 6.7	41.95	69	41.7	21	48.34	31	46.9	19	29.88	79	28.6	20	39.57	37	61.7	22
16.7	42.59	64	44.2	25	48.62	28	48.8	19	30.62	74	31.0	24	39.91	34	64.0	23
26.6	43.17	58	47.0	28	48.88	26	50.6	18	31.30	68	33.8	28	40.22	31	66.4	24
Sept. 5.6	43.68	51	50.1	31	49.11	23	52.2	16	31.90	60	36.9	31	40.50	28	68.9	25
15.6	44.12	44	53.4	33	49.31	20	53.7	15	32.41	51	40.1	32	40.75	25	71.4	25
25.5	44.48	36	56.8	34	49.48	17	55.0	13	32.83	42	43.5	34	40.96	21	73.9	25
Oct. 5.5	44.75	27	60.3	35	49.61	13	56.1	11	33.15	32	47.0	35	41.12	16	76.3	24
15.5	44.93	18	63.8	35	49.71	10	57.0	9	33.37	22	50.6	36	41.24	12	78.7	24
25.5	45.01	8	67.3	35	49.78	7	57.7	7	33.48	11	54.2	36	41.32	8	80.9	22
Nov. 4.4	45.00	1	70.6	33	49.82	4	58.2	5	33.48	0	57.6	34	41.36	4	82.9	20
14.4	44.90	10	73.7	31	49.83	1	58.5	3	33.38	10	60.8	32	41.37	1	84.7	18
24.4	44.72	18	76.5	28	49.81	2	58.6	1	33.18	20	63.8	30	41.34	3	86.2	15
Dec. 4.4	44.45	27	78.9	24	49.77	4	58.6	0	32.88	30	66.4	26	41.28	6	87.5	13
14.3	44.10	35	80.9	20	49.71	6	58.4	2	32.48	40	68.5	21	41.18	10	88.4	9
24.3	43.69	41	82.4	15	49.63	8	58.1	3	31.99	49	70.2	17	41.06	12	88.9	5
34.3	43.22	47	83.3	9	49.53	10	57.7	4	31.45	54	71.3	11	40.91	15	89.1	2
Sec δ, Tan δ	2.898		+2.720		1.035		−0.266		3.343		+3.190		1.324		+0.868	
Mean Place	$39^{s}.740$		$43''.86$		$46^{s}.307$		$32''.97$		$27^{s}.647$		$31''.38$		$37^{s}.598$		$56''.46$	
$D'_{\psi}\alpha$, $D_{\omega}\alpha$	+0.03		−0.18		0.00		−0.02		+0.03		−0.20		+0.01		−0.06	
$D_{\psi}\delta$, $D_{\omega}\delta$	+0.4		+0.4		+0.4		+0.4		+0.4		+0.4		+0.4		+0.4	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	**π Piscium.** Mag. 5.6				**υ Persei.** Mag. 3.8				**α Eridani.** Mag. 0.6				**ω Cassiopeiæ.** Mag. 5.5			
	Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination N.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	1 32		+11 41		1 32		+48 10		1 34		−57 40		1 35		+67 35	
	s		″		s		″		s		″		s		″	
Jan. 0.3	25.65	11	33.0	5	34.48	20	71.9	1	27.34	31	78.3	4	47.59	43	72.4	6
10.3	25.54	11	32.5	6	34.28	22	72.0	2	27.03	32	78.7	2	47.16	46	73.0	1
20.2	25.43	12	31.9	6	34.06	22	71.8	7	26.71	32	78.5	8	46.70	47	73.1	4
30.2	25.31	12	31.3	6	33.84	22	71.1	11	26.39	30	77.7	13	46.23	45	72.7	10
Feb. 9.2	25.19	11	30.7	6	33.62	20	70.0	14	26.09	28	76.4	18	45.78	42	71.7	15
19.2	25.08	10	30.1	6	33.42	18	68.6	17	25.81	25	74.6	22	45.36	38	70.2	19
29.1	24.98	7	29.5	5	33.24	14	66.9	19	25.56	21	72.4	26	44.98	30	68.3	23
Mar. 10.1	24.91	4	29.0	3	33.10	9	65.0	20	25.35	15	69.8	30	44.68	21	66.0	25
20.1	24.87	1	28.7	1	33.01	4	63.0	20	25.20	10	66.8	33	44.47	11	63.5	26
30.0	24.86	3	28.6	1	32.97	3	61.0	20	25.10	3	63.5	34	44.36	0	60.9	26
Apr. 9.0	24.89	8	28.7	2	33.00	10	59.0	18	25.07	4	60.1	36	44.36	11	58.3	26
19.0	24.97	12	28.9	5	33.10	16	57.2	15	25.11	11	56.5	37	44.47	22	55.7	24
29.0	25.09	17	29.4	8	33.26	22	55.7	12	25.22	17	52.8	37	44.69	33	53.3	20
May 8.9	25.26	21	30.2	10	33.48	28	54.5	9	25.39	24	49.1	35	45.02	42	51.3	17
18.9	25.47	24	31.2	13	33.76	33	53.6	5	25.63	31	45.6	34	45.44	51	49.6	13
28.9	25.71	28	32.5	15	34.09	37	53.1	1	25.94	37	42.2	31	45.95	57	48.3	9
June 7.9	25.99	30	34.0	16	34.46	41	53.0	4	26.31	41	39.1	28	46.52	63	47.4	4
17.8	26.29	32	35.6	18	34.87	43	53.4	8	26.72	45	36.3	24	47.15	67	47.0	2
27.8	26.61	32	37.4	19	35.30	43	54.2	12	27.17	47	33.9	20	47.82	68	47.2	6
July 7.8	26.93	33	39.3	20	35.73	44	55.4	15	27.64	48	31.9	15	48.50	69	47.8	11
17.7	27.26	32	41.3	19	36.17	43	56.9	18	28.12	49	30.4	9	49.19	68	48.9	16
27.7	27.58	30	43.2	19	36.60	41	58.7	21	28.61	47	29.5	3	49.87	65	50.5	20
Aug. 6.7	27.88	29	45.1	18	37.01	38	60.8	24	29.08	45	29.2	2	50.52	60	52.5	24
16.7	28.17	26	46.9	17	37.39	35	63.2	26	29.53	41	29.4	8	51.12	56	54.9	27
26.6	28.43	23	48.6	15	37.74	31	65.8	27	29.94	36	30.2	14	51.68	50	57.6	29
Sept. 5.6	28.66	20	50.1	13	38.05	27	68.5	28	30.30	30	31.6	18	52.18	43	60.5	32
15.6	28.86	17	51.4	11	38.32	22	71.3	28	30.60	24	33.4	22	52.61	35	63.7	33
25.6	29.03	14	52.5	9	38.54	18	74.1	27	30.84	17	35.6	25	52.96	28	67.0	34
Oct. 5.5	29.17	10	53.4	7	38.72	13	76.8	27	31.01	10	38.1	28	53.24	20	70.4	34
15.5	29.27	7	54.1	5	38.85	9	79.5	26	31.11	3	40.9	29	53.44	12	73.8	34
25.5	29.34	4	54.6	3	38.94	5	82.1	24	31.14	4	43.8	28	53.56	3	77.2	33
Nov. 4.4	29.38	2	54.9	1	38.99	0	84.5	22	31.10	10	46.6	28	53.59	5	80.5	31
14.4	29.40	1	55.0	0	38.99	4	86.7	19	31.00	16	49.4	25	53.54	13	83.6	28
24.4	29.39	3	55.0	2	38.95	9	88.6	16	30.84	21	51.9	22	53.41	21	86.4	24
Dec. 4.4	29.36	6	54.8	3	38.86	12	90.2	12	30.63	25	54.1	17	53.20	28	88.8	20
14.3	29.30	8	54.5	4	38.74	15	91.4	8	30.38	28	55.8	13	52.92	35	90.8	15
24.3	29.22	9	54.1	5	38.59	18	92.2	4	30.10	31	57.1	7	52.57	39	92.3	10
34.3	29.13		53.6		38.41		92.6		29.79		57.8		52.18		93.3	
Sec δ, Tan δ	1.021		+0.207		1.500		+1.118		1.870		−1.581		2.625		+2.427	
Mean Place	$25^{\mathrm{s}}.868$		30″.01		$35^{\mathrm{s}}.019$		57″.73		$26^{\mathrm{s}}.269$		61″.28		$48^{\mathrm{s}}.406$		54″.26	
$D'_{\psi}\,\alpha$, $D_{\omega}\,\alpha$	0.00		−0.01		+0.01		−0.07		−0.02		+0.10		+0.03		−0.15	
$D_{\psi}\,\delta$, $D_{\omega}\,\delta$	+0.4		+0.4		+0.4		+0.4		+0.4		+0.4		+0.4		+0.4	

Mean Solar Date.	**ν Piscium.** Mag. 4.7				**φ Persei.** Mag. 4.2				**τ Ceti.** Mag. 3.6				**ο Piscium.** Mag. 4.5			
	Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination N.	
	h m 1 36		° ′ + 5 2		h m 1 38		° ′ +50 14		h m 1 39		° ′ −16 23		h m 1 40		° ′ + 8 42	
	s		″		s		″		s		″		s		″	
Jan. 0.3	50.89		34.4		7.73		59.8		58.88		68.1		44.55		56.8	
10.3	50.79	10	33.8	6	7.52	21	60.0	2	58.76	12	68.8	7	44.45	10	56.3	5
20.2	50.67	12	33.2	6	7.29	23	59.8	2	58.63	13	69.3	5	44.34	11	55.7	6
30.2	50.55	12	32.7	5	7.06	23	59.2	6	58.50	13	69.5	2	44.21	13	55.1	6
Feb. 9.2	50.43	12	32.2	5	6.82	24	58.2	10	58.36	14	69.4	1	44.09	12	54.6	5
19.2	50.32	11	31.8	4	6.60	22	56.8	14	58.24	12	69.1	3	43.98	11	54.1	5
29.1	50.22	10	31.5	3	6.41	19	55.1	17	58.13	11	68.5	6	43.88	10	53.7	4
Mar. 10.1	50.15	7	31.4	1	6.26	15	53.2	19	58.04	9	67.6	9	43.80	8	53.4	3
20.1	50.10	5	31.4	0	6.15	11	51.2	20	57.98	6	66.4	12	43.75	5	53.2	2
30.0	50.09	1	31.6	2	6.10	5	49.1	21	57.95	3	64.9	15	43.73	2	53.2	0
Apr. 9.0	50.12	3	32.1	5	6.12	2	47.1	20	57.96	1	63.2	17	43.76	3	53.4	2
19.0	50.19	7	32.8	7	6.21	9	45.2	19	58.02	6	61.3	19	43.83	7	53.9	5
29.0	50.30	11	33.7	9	6.37	16	43.6	16	58.12	10	59.1	22	43.94	11	54.6	7
May 8.9	50.46	16	34.8	11	6.59	22	42.2	14	58.26	14	56.8	23	44.10	16	55.5	9
18.9	50.66	20	36.2	14	6.87	28	41.2	10	58.45	19	54.4	24	44.30	20	56.6	11
28.9	50.90	24	37.8	16	7.21	34	40.6	6	58.68	23	51.9	25	44.53	23	58.0	14
June 7.9	51.17	27	39.5	17	7.59	38	40.4	2	58.94	26	49.4	25	44.80	27	59.6	16
17.8	51.46	29	41.4	19	8.01	42	40.6	2	59.22	28	46.9	25	45.10	30	61.4	18
27.8	51.77	31	43.3	19	8.44	43	41.3	7	59.53	31	44.5	24	45.41	31	63.2	18
July 7.8	52.09	32	45.3	20	8.89	45	42.3	10	59.85	32	42.3	22	45.73	32	65.1	19
17.7	52.42	33	47.3	20	9.35	46	43.7	14	60.17	32	40.3	20	46.06	33	67.1	20
27.7	52.74	32	49.2	19	9.79	44	45.5	18	60.49	32	38.6	17	46.38	32	69.0	19
Aug. 6.7	53.04	30	51.0	18	10.22	43	47.6	21	60.80	31	37.2	14	46.68	30	70.8	18
16.7	53.32	28	52.6	16	10.61	39	49.9	23	61.09	29	36.2	10	46.97	29	72.5	17
26.6	53.58	26	54.0	14	10.98	37	52.5	26	61.35	26	35.5	7	47.23	26	74.0	15
Sept. 5.6	53.81	23	55.2	12	11.31	33	55.2	27	61.59	24	35.1	4	47.47	24	75.4	14
15.6	54.01	20	56.2	10	11.60	29	58.0	28	61.79	20	35.2	1	47.68	21	76.6	12
25.6	54.18	17	56.9	7	11.84	24	60.8	28	61.96	17	35.6	4	47.85	17	77.5	9
Oct. 5.5	54.32	14	57.4	5	12.03	19	63.6	28	62.09	13	36.3	7	48.00	15	78.2	7
15.5	54.43	11	57.7	3	12.18	15	66.4	28	62.19	10	37.3	10	48.11	11	78.7	5
25.5	54.50	7	57.8	1	12.28	10	69.1	27	62.26	7	38.5	12	48.19	8	79.0	3
Nov. 4.4	54.55	5	57.7	1	12.33	5	71.6	25	62.29	3	39.8	13	48.24	5	79.1	1
14.4	54.57	2	57.4	3	12.33	0	73.9	23	62.30	1	41.2	14	48.26	2	79.0	1
24.4	54.56	1	57.0	4	12.29	4	75.9	20	62.27	3	42.6	14	48.26	0	78.8	2
Dec. 4.4	54.53	3	56.5	5	12.21	8	77.6	17	62.22	5	43.9	13	48.23	3	78.5	3
14.3	54.47	6	56.0	5	12.09	12	78.9	13	62.15	7	45.1	12	48.18	5	78.1	4
24.3	54.40	7	55.4	6	11.93	16	79.9	10	62.06	9	46.2	11	48.10	8	77.7	4
34.3	54.30	10	54.8	6	11.74	19	80.4	5	61.95	11	47.1	9	48.01	9	77.1	6
Sec δ, Tan δ	1.004		+0.088		1.564		+1.202		1.042		−0.294		1.012		+0.153	
Mean Place	51ˢ.019		33″.55		8ˢ.243		45″.03		58ˢ.762		61″.94		44ˢ.692		54″.56	
D′ψ α, Dω α	0.00		−0.01		+0.01		−0.07		0.00		+0.02		0.00		−0.01	
Dψ δ, Dω δ	+0.4		+0.4		+0.4		+0.4		+0.4		+0.4		+0.4		+0.4	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	ε Sculptoris. Mag. 5.4				ζ Ceti. Mag. 3.9				ε Cassiopeiæ. Mag. 3.4				α Trianguli. Mag. 3.6			
	Right Ascension.		Declination S.		Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination N.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	1 41		−25 29		1 47		−10 45		1 47		+63 14		1 48		+29 9	
	s		″		s		″		s		″		s		″	
Jan. 0.3	31.52	14	40.0	8	7.07	11	73.9	7	62.50	33	31.5	7	3.42	12	11.1	1
10.3	31.38	14	40.8	4	6.96	12	74.6	6	62.17	37	32.2	2	3.30	14	11.0	4
20.2	31.24	15	41.2	1	6.84	12	75.2	3	61.80	38	32.4	4	3.16	15	10.6	6
30.2	31.09	14	41.3	3	6.72	13	75.5	1	61.42	38	32.0	8	3.01	15	10.0	9
Feb. 9.2	30.95	13	41.0	6	6.59	12	75.6	1	61.04	35	31.2	14	2.86	14	9.1	10
19.2	30.82	12	40.4	10	6.47	11	75.5	3	60.69	32	29.8	18	2.72	13	8.1	11
29.1	30.70	10	39.4	13	6.36	9	75.2	6	60.37	26	28.0	21	2.59	11	7.0	12
Mar. 10.1	30.60	7	38.1	17	6.27	6	74.6	9	60.11	19	25.9	23	2.48	7	5.8	11
20.1	30.53	4	36.4	19	6.21	2	73.7	11	59.92	11	23.6	24	2.41	3	4.7	11
30.1	30.49	1	34.5	21	6.19	1	72.6	14	59.81	2	21.2	25	2.38	2	3.6	10
Apr. 9.0	30.50	6	32.4	24	6.20	5	71.2	16	59.79	8	18.7	24	2.40	7	2.6	8
19.0	30.56	10	30.0	26	6.25	10	69.6	18	59.87	18	16.3	23	2.47	12	1.8	5
29.0	30.66	14	27.4	27	6.35	14	67.8	20	60.05	26	14.0	20	2.59	17	1.3	3
May 8.9	30.80	19	24.7	27	6.49	19	65.8	21	60.31	35	12.0	16	2.76	21	1.0	0
18.9	30.99	23	22.0	28	6.68	22	63.7	22	60.66	43	10.4	12	2.97	26	1.0	3
28.9	31.22	27	19.2	28	6.90	26	61.5	23	61.09	49	9.2	8	3.23	30	1.3	7
June 7.9	31.49	30	16.4	26	7.16	28	59.2	23	61.58	54	8.4	4	3.53	32	2.0	9
17.8	31.79	32	13.8	25	7.44	31	56.9	23	62.12	58	8.0	1	3.85	34	2.9	12
27.8	32.11	33	11.3	22	7.75	31	54.6	22	62.70	60	8.1	6	4.19	36	4.1	15
July 7.8	32.44	34	9.1	19	8.06	32	52.4	20	63.30	60	8.7	10	4.55	36	5.6	17
17.8	32.78	33	7.2	16	8.38	32	50.4	18	63.90	59	9.7	15	4.91	35	7.3	18
27.7	33.11	32	5.6	12	8.70	31	48.6	15	64.49	58	11.2	19	5.26	34	9.1	20
Aug. 6.7	33.43	31	4.4	8	9.01	29	47.1	12	65.07	55	13.1	22	5.60	32	11.1	21
16.7	33.74	28	3.6	3	9.30	27	45.9	9	65.62	50	15.3	26	5.92	29	13.2	21
26.6	34.02	25	3.3	1	9.57	24	45.0	5	66.12	45	17.9	28	6.21	27	15.3	20
Sept. 5.6	34.27	21	3.4	5	9.81	21	44.5	2	66.57	39	20.7	30	6.48	24	17.3	20
15.6	34.48	18	3.9	9	10.02	18	44.3	1	66.96	34	23.7	31	6.72	20	19.3	19
25.6	34.66	14	4.8	12	10.20	14	44.4	4	67.30	28	26.8	32	6.92	16	21.2	18
Oct. 5.5	34.80	11	6.0	15	10.34	11	44.8	7	67.58	20	30.0	33	7.08	14	23.0	17
15.5	34.91	7	7.5	16	10.45	8	45.5	9	67.78	14	33.3	32	7.22	9	24.7	15
25.5	34.98	3	9.1	18	10.53	5	46.4	10	67.92	7	36.5	31	7.31	7	26.2	14
Nov. 4.5	35.01	1	10.9	19	10.58	2	47.4	12	67.99	0	39.6	29	7.38	3	27.6	11
14.4	35.00	3	12.8	18	10.60	1	48.6	12	67.99	7	42.5	27	7.41	0	28.7	9
24.4	34.97	6	14.6	17	10.59	4	49.8	12	67.92	13	45.2	23	7.41	3	29.6	7
Dec. 4.4	34.91	8	16.3	15	10.55	5	51.0	11	67.79	20	47.5	19	7.38	5	30.3	5
14.3	34.83	11	17.8	12	10.50	8	52.1	10	67.59	26	49.4	15	7.33	9	30.8	2
24.3	34.72	12	19.0	10	10.42	10	53.1	9	67.33	31	50.9	11	7.24	11	31.0	0
34.3	34.60		20.0		10.32		54.0		67.02		52.0		7.13		31.0	
Sec δ, Tan δ	1.108		−0.477		1.018		−0.190		2.221		+1.983		1.145		+0.558	
Mean Place	$31^{s}.268$		31″.10		$6^{s}.983$		69″.75		$63^{s}.067$		14″.02		$3^{s}.679$		2″.01	
$D'_{\psi}\alpha$, $D_{\omega}\alpha$	−0.01		+0.03		0.00		+0.01		+0.02		−0.12		+0.01		−0.03	
$D_{\psi}\delta$, $D_{\omega}\delta$	+0.4		+0.4		+0.4		+0.5		+0.4		+0.5		+0.4		+0.5	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	ξ Piscium. Mag. 4.8				β Arietis. Mag. 2.7				ψ Phœnicis. Mag. 4.4				υ Ceti. Mag. 4.2			
	Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination S.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	1 48		+ 2 45		1 49		+20 22		1 50		−46 43		1 55		−21 29	
	s		″		s		″		s		″		s		″	
Jan. 0.3	59.87	10	13.1	7	46.34	11	48.1	4	7.76	22	75.2	8	51.76	12	80.8	9
10.3	59.77	11	12.4	5	46.23	13	47.7	4	7.54	23	76.0	2	51.64	13	81.7	6
20.2	59.66	12	11.9	5	46.10	13	47.3	6	7.31	23	76.2	3	51.51	14	82.3	2
30.2	59.54	13	11.4	5	45.97	14	46.7	8	7.08	23	75.9	8	51.37	15	82.5	1
Feb. 9.2	59.41	12	10.9	3	45.83	13	45.9	8	6.85	22	75.1	13	51.22	14	82.4	4
19.2	59.29	10	10.6	2	45.70	12	45.1	8	6.63	19	73.8	17	51.08	12	82.0	8
29.1	59.19	9	10.4	0	45.58	9	44.3	8	6.44	17	72.1	22	50.96	10	81.2	11
Mar. 10.1	59.10	6	10.4	2	45.49	6	43.5	7	6.27	13	69.9	25	50.86	8	80.1	14
20.1	59.04	2	10.6	3	45.43	3	42.8	6	6.14	8	67.4	28	50.78	5	78.7	16
30.1	59.02	2	10.9	6	45.40	2	42.2	5	6.06	3	64.6	30	50.73	0	77.1	19
Apr. 9.0	59.04	5	11.5	8	45.42	6	41.7	3	6.03	2	61.6	33	50.73	4	75.2	22
19.0	59.09	10	12.3	10	45.48	11	41.4	0	6.05	8	58.3	34	50.77	8	73.0	24
29.0	59.19	15	13.3	12	45.59	16	41.4	2	6.13	14	54.9	35	50.85	13	70.6	25
May 8.9	59.34	19	14.5	15	45.75	20	41.6	5	6.27	20	51.4	34	50.98	18	68.1	26
18.9	59.53	23	16.0	17	45.95	25	42.1	8	6.47	25	48.0	33	51.16	22	65.5	27
28.9	59.76	26	17.7	18	46.20	28	42.9	10	6.72	29	44.7	32	51.38	25	62.8	26
June 7.9	60.02	29	19.5	19	46.48	31	43.9	13	7.01	33	41.5	29	51.63	28	60.2	26
17.8	60.31	30	21.4	20	46.79	32	45.2	15	7.34	37	38.6	26	51.91	31	57.6	25
27.8	60.61	31	23.4	20	47.11	33	46.7	16	7.71	39	36.0	22	52.22	32	55.1	23
July 7.8	60.92	32	25.4	19	47.44	34	48.3	18	8.10	40	33.8	18	52.54	33	52.8	20
17.8	61.24	32	27.3	19	47.78	34	50.1	19	8.50	40	32.0	13	52.87	33	50.8	17
27.7	61.56	31	29.2	17	48.12	32	52.0	19	8.90	39	30.7	8	53.20	32	49.1	13
Aug. 6.7	61.87	29	30.9	16	48.44	30	53.9	19	9.29	38	29.9	2	53.52	30	47.8	10
16.7	62.16	26	32.5	13	48.74	28	55.8	18	9.67	35	29.7	3	53.82	28	46.8	6
26.6	62.42	24	33.8	11	49.02	26	57.6	18	10.02	31	30.0	9	54.10	26	46.2	1
Sept. 5.6	62.66	22	34.9	9	49.28	22	59.4	16	10.33	26	30.9	13	54.36	22	46.1	3
15.6	62.88	18	35.8	6	49.50	19	61.0	15	10.59	22	32.2	18	54.58	19	46.4	7
25.6	63.06	15	36.4	3	49.69	16	62.5	13	10.81	17	34.0	22	54.77	16	47.1	10
Oct. 5.5	63.21	11	36.7	1	49.85	13	63.8	12	10.98	12	36.2	24	54.93	12	48.1	12
15.5	63.32	9	36.8	1	49.98	9	65.0	10	11.10	7	38.6	26	55.05	8	49.3	15
25.5	63.41	6	36.7	2	50.07	7	66.0	8	11.17	1	41.2	26	55.13	5	50.8	17
Nov. 4.5	63.47	3	36.5	4	50.14	4	66.8	6	11.18	4	43.8	26	55.18	2	52.5	17
14.4	63.50	0	36.1	6	50.18	0	67.4	5	11.14	8	46.4	25	55.20	2	54.2	17
24.4	63.50	3	35.5	6	50.18	2	67.9	3	11.06	12	48.9	23	55.18	4	55.9	16
Dec. 4.4	63.47	5	34.9	6	50.16	5	68.2	1	10.94	15	51.2	19	55.14	7	57.5	15
14.3	63 42	6	34.3	6	50.11	8	68.3	1	10.79	19	53.1	14	55.07	9	59.0	13
24.3	63.36	9	33.7	7	50.03	9	68.2	2	10.60	21	54.5	11	54.98	11	60.3	11
34.3	63.27		33.0		49.94		68.0		10.39		55.6		54.87		61.4	
Sec δ, Tan δ	1.001		+0.048		1.067		+0.371		1.459		−1.062		1.075		−0.394	
Mean Place	$59^{s}.904$		$12''.57$		$46^{s}.516$		$41''.68$		$6^{s}.983$		$61''.20$		$51^{s}.489$		$73''.75$	
$D'_{\psi}\alpha$, $D_{\omega}\alpha$	0.00		0.00		0.00		−0.02		−0.01		+0.06		−0.01		+0.02	
$D_{\psi}\delta$, $D_{\omega}\delta$	+0.4		+0.5		+0.4		+0.5		+0.4		+0.5		+0.3		+0.5	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	**50 Cassiopeiæ.** Mag. 4.1				**α Hydri.** Mag. 3.0				**γ Andromedæ *pr*.** Mag. 2.3				**α Arietis.** Mag. 2.2			
	Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination N.	
	h m 1 55		° ′ +71 59		h m 1 55		° ′ −61 59		h m 1 58		° ′ +41 54		h m 2 2		° ′ +23 2	
	s		″		s		″		s		″		s		″	
an. 0.3	53.15		64.7		61.02		68.5		29.23		41.6		12.43		56.0	
10.3	52.62	53	65.7	10	60.64	38	69.1	6	29.08	15	41.8	2	12.32	11	55.8	2
20.3	52.05	57	66.2	5	60.25	39	69.2	1	28.90	18	41.7	1	12.19	13	55.4	4
30.2	51.46	59	66.1	1	59.86	39	68.6	6	28.71	19	41.2	5	12.05	14	54.8	6
eb. 9.2	50.86	60	65.4	7	59.47	39	67.5	11	28.51	20	40.4	8	11.91	14	54.1	7
19.2	50.29	57	64.1	13	59.11	36	65.8	17	28.32	19	39.3	11	11.77	14	53.3	8
29.1	49.78	51	62.4	17	58.78	33	63.7	21	28.15	17	37.9	14	11.65	12	52.5	8
Mar.10.1	49.35	43	60.3	21	58.50	28	61.1	26	28.01	14	36.4	15	11.54	11	51.6	9
20.1	49.03	32	57.8	25	58.27	23	58.1	30	27.91	10	34.8	16	11.46	8	50.8	8
30.1	48.82	21	55.2	26	58.10	17	54.9	32	27.85	6	33.1	17	11.42	4	50.0	8
pr. 9.0	48.75	7	52.5	27	58.00	10	51.4	35	27.85	0	31.5	16	11.43	1	49.4	6
19.0	48.81	6	49.8	27	57.98	2	47.7	37	27.91	6	30.0	15	11.48	5	48.9	5
29.0	49.00	19	47.3	25	58.04	6	44.0	37	28.03	12	28.7	13	11.58	10	48.7	2
ay 9.0	49.33	33	44.9	24	58.18	14	40.2	38	28.21	18	27.7	10	11.73	15	48.8	1
18.9	49.79	46	42.9	20	58.40	22	36.6	36	28.44	23	27.0	7	11.92	19	49.1	3
28.9	50.35	56	41.2	17	58.69	29	33.1	35	28.72	28	26.6	4	12.16	24	49.6	5
me 7.9	51.01	66	40.0	12	59.05	36	29.8	33	29.05	33	26.6	0	12.44	28	50.5	9
17.8	51.74	73	39.3	7	59.47	42	26.8	30	29.41	36	27.0	4	12.74	30	51.6	11
27.8	52.52	78	39.1	2	59.94	47	24.2	26	29.79	38	27.7	7	13.06	32	52.9	13
ly 7.8	53.34	82	39.3	2	60.44	50	22.1	21	30.19	40	28.8	11	13.40	34	54.4	15
17.8	54.17	83	40.1	8	60.97	53	20.5	16	30.60	41	30.1	13	13.75	35	56.1	17
27.7	54.99	82	41.3	12	61.51	54	19.4	11	31.00	40	31.8	17	14.09	34	57.9	18
ug. 6.7	55.80	81	43.0	17	62.04	53	18.9	5	31.38	38	33.7	19	14.42	33	59.7	18
16.7	56.56	76	45.1	21	62.54	50	19.0	1	31.75	37	35.8	21	14.73	31	61.6	19
26.7	57.27	71	47.5	24	63.01	47	19.7	7	32.10	35	38.0	22	15.02	29	63.5	19
pt. 5.6	57.92	65	50.3	28	63.44	43	21.0	13	32.41	31	40.3	23	15.29	27	65.3	18
15.6	58.49	57	53.3	30	63.81	37	22.8	18	32.69	28	42.7	24	15.53	24	67.0	17
25.6	58.98	49	56.6	33	64.11	30	25.0	22	32.93	24	45.1	24	15.74	21	68.6	16
ct. 5.5	59.38	40	60.0	34	64.33	22	27.6	26	33.13	20	47.5	24	15.91	17	70.0	14
15.5	59.68	30	63.4	34	64.47	14	30.4	28	33.29	16	49.8	23	16.06	15	71.3	13
25.5	59.88	20	66.9	35	64.54	7	33.4	30	33.41	12	52.0	22	16.17	11	72.4	11
ov. 4.5	59.98	10	70.3	34	64.52	2	36.4	30	33.50	9	54.1	21	16.25	8	73.3	9
14.4	59.97	1	73.6	33	64.42	10	39.4	30	33.54	4	56.0	19	16.30	5	74.1	8
24.4	59.85	12	76.6	30	64.26	16	42.1	27	33.54	0	57.6	16	16.31	1	74.7	6
ec. 4.4	59.62	23	79.4	28	64.03	23	44.5	24	33.51	3	59.0	14	16.30	1	75.1	4
14.4	59.30	32	81.7	23	63.75	28	46.5	20	33.44	7	60.1	11	16.26	4	75.4	3
24.3	58.89	41	83.6	19	63.42	33	48.0	15	33.33	11	60.9	8	16.19	7	75.5	1
34.3	58.41	48	85.0	24	63.05	37	49.0	10	33.20	13	61.4	5	16.10	9	75.4	1
δ, Tan δ	3.236		+3.078		2.130		−1.880		1.344		+0.898		1.087		+0.425	
an Place	$53^{s}.726$		$45''.76$		$59^{s}.435$		$52''.16$		$29^{s}.508$		$28''.62$		$12^{s}.549$		$48''.43$	
α, $D_{\omega}\alpha$	+0.04		−0.18		−0.02		+0.11		+0.01		−0.05		+0.01		−0.02	
δ, $D_{\omega}\delta$	*+0.3*		*+0.5*		*+0.3*		+0.5		+0.3		+0.5		+0.3		+0.5	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	β **Trianguli.** Mag. 3.1				**55 Cassiopeiæ.** Mag. 6.2				**6 Persei.** Mag. 5.4				ξ¹ **Ceti.** Mag. 4.5			
	Right Ascension.		**Declination N.**		**Right Ascension.**		**Declination N.**		**Right Ascension.**		**Declination N.**		**Right Ascension.**		**Declination N.**	
	h m 2 4		° ′ +34 34		h m 2 7		° ′ +66 6		h m 2 7		° ′ +50 39		h m 2 8		° ′ + 8 26	
	s		″		s		″		s		″		s		″	
Jan. 0.3	17.97		28.4		33.29		63.4		44.45		42.3		20.04		6.3	
10.3	17.84	13	28.5	1	32.92	37	64.4	10	44.26	19	42.8	5	19.95	9	5.8	5
20.3	17.69	15	28.3	2	32.51	41	64.9	5	44.03	23	42.9	1	19.84	11	5.2	6
30.2	17.53	16	27.8	5	32.08	43	64.8	1	43.79	24	42.6	3	19.71	13	4.7	5
Feb. 9.2	17.36	17	27.1	7	31.65	43	64.2	6	43.55	24	41.9	7	19.58	13	4.2	5
19.2	17.19	17	26.1	10	31.23	42	63.1	11	43.31	24	40.8	11	19.46	12	3.8	4
29.1	17.04	15	25.0	11	30.85	38	61.5	16	43.09	22	39.4	14	19.34	12	3.4	4
Mar. 10.1	16.91	13	23.7	13	30.52	33	59.6	19	42.90	19	37.7	17	19.24	10	3.1	3
20.1	16.82	9	22.4	13	30.26	26	57.3	23	42.76	14	35.8	19	19.16	8	3.0	1
30.1	16.77	5	21.1	13	30.09	17	54.9	24	42.68	8	33.8	20	19.12	4	3.0	0
Apr. 9.0	16.77	0	19.8	13	30.02	7	52.4	25	42.66	2	31.9	19	19.12	0	3.2	2
19.0	16.82	5	18.7	11	30.06	4	49.9	25	42.70	4	30.0	19	19.16	4	3.6	4
29.0	16.93	11	17.8	9	30.21	15	47.5	24	42.82	12	28.2	18	19.25	9	4.3	7
May 9.0	17.09	16	17.2	6	30.46	25	45.3	22	43.00	18	26.7	15	19.38	13	5.2	9
18.9	17.30	21	16.8	4	30.80	34	43.4	19	43.25	25	25.5	12	19.55	17	6.3	11
28.9	17.55	25	16.8	0	31.23	43	41.9	15	43.56	31	24.6	9	19.77	22	7.6	13
June 7.9	17.85	30	17.1	3	31.74	51	40.7	12	43.92	36	24.1	5	20.02	25	9.1	15
17.8	18.18	33	17.7	6	32.31	57	40.0	7	44.32	40	24.0	1	20.30	28	10.8	17
27.8	18.53	35	18.6	9	32.93	62	39.8	2	44.76	44	24.4	4	20.60	30	12.5	17
July 7.8	18.90	37	19.8	12	33.58	65	40.1	3	45.21	45	25.1	7	20.92	32	14.3	18
17.8	19.28	38	21.3	15	34.24	66	40.8	7	45.67	46	26.2	11	21.24	32	16.2	19
27.7	19.65	37	23.0	17	34.90	66	42.0	12	46.12	45	27.6	14	21.56	32	18.0	18
Aug. 6.7	20.01	36	24.8	18	35.54	64	43.6	16	46.57	45	29.3	17	21.87	31	19.8	18
16.7	20.36	35	26.8	20	36.16	62	45.6	20	47.00	43	31.3	20	22.17	30	21.4	16
26.7	20.68	32	28.9	21	36.75	59	47.9	23	47.40	40	33.6	23	22.45	28	22.9	15
Sept. 5.6	20.97	29	31.0	21	37.28	53	50.5	26	47.76	36	36.0	24	22.70	25	24.2	13
15.6	21.23	26	33.1	21	37.76	48	53.4	29	48.09	33	38.6	26	22.93	23	25.3	11
25.6	21.46	23	35.2	21	38.17	41	56.4	30	48.38	29	41.2	26	23.13	20	26.1	
Oct. 5.5	21.66	20	37.2	20	38.52	35	59.6	32	48.63	25	43.9	27	23.30	17	26.8	
15.5	21.82	16	39.1	19	38.80	28	62.8	32	48.83	20	46.6	27	23.44	14	27.2	
25.5	21.94	12	40.9	18	39.00	20	66.1	33	48.98	15	49.2	26	23.55	11	27.4	
Nov. 4.5	22.03	9	42.6	17	39.12	12	69.3	32	49.08	10	51.7	25	23.63	8	27.5	
14.4	22.08	5	44.0	14	39.16	4	72.4	31	49.14	6	54.1	24	23.68	5	27.4	
24.4	22.10	2	45.3	13	39.12	4	75.2	28	49.14	0	56.2	21	23.70	2	27.1	
Dec. 4.4	22.08	2	46.3	10	39.00	12	77.8	26	49.10	4	58.1	19	23.69	1	26.8	
14.4	22.03	5	47.1	8	38.81	19	80.0	22	49.02	8	59.6	15	23.66	3	26.4	
24.3	21.94	9	47.7	6	38.55	26	81.8	18	48.89	13	60.8	12	23.60	6	25.9	
34.3	21.83	11	47.9	2	38.22	33	83.2	14	48.71	18	61.6	8	23.52	8	25.4	
Sec δ, Tan δ	1.214		+0.689		2.470		+2.258		1.577		+1.220		1.011		+0.148	
Mean Place	$18^{s}.159$		$17''.39$		$33^{s}.612$		$45''.23$		$44^{s}.691$		$27''.08$		$20^{s}.025$		$3''.28$	
$D'_{\psi}\alpha$, $D_{\omega}\alpha$	+0.01		−0.04		+0.03		−0.13		+0.02		−0.07		0.00		−0.01	
$D_{\psi}\delta$, $D_{\omega}\delta$	+0.3		+0.5		+0.3		+0.5		+0.3		+0.5		+0.3		+0.5	

Solar Date.	*µ* Fornacis. Mag. 5.2				*γ* Trianguli. Mag. 4.1				67 Ceti. Mag. 5.7				*ϕ* Eridani. Mag. 3.8			
	Right Ascension		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination S.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	2 9		−31 7		2 12		+33 26		2 12		− 6 49		2 13		−51 54	
	s		″		s		″		s		″		s		″	
n. 0.3	2.23		80.8		4.57		37.3		35.77		40.2		23.00		83.1	
10.3	2.09	14	81.8	10	4.45	12	37.4	1	35.67	10	41.0	8	22.75	25	84.0	9
20.3	1.93	16	82.4	6	4.30	15	37.2	2	35.55	12	41.6	6	22.48	27	84.4	4
30.2	1.76	17	82.6	2	4.14	16	36.8	4	35.42	13	42.1	5	22.20	28	84.3	1
b. 9.2	1.59	17	82.3	3	3.98	16	36.1	7	35.29	13	42.3	2	21.92	28	83.6	7
19.2	1.42	17	81.7	6	3.81	17	35.2	9	35.16	13	42.4	1	21.65	27	82.5	11
29.2	1.27	15	80.7	10	3.66	15	34.2	10	35.03	13	42.3	1	21.39	26	80.8	17
ar.10.1	1.13	14	79.3	14	3.53	13	33.0	12	34.93	10	41.9	4	21.17	22	78.7	21
20.1	1.02	11	77.5	18	3.43	10	31.7	13	34.85	8	41.3	6	20.99	18	76.2	25
30.1	0.95	7	75.4	21	3.37	6	30.5	12	34.80	5	40.4	9	20.85	14	73.3	29
pr. 9.0	0.92	3	73.0	24	3.36	1	29.3	12	34.79	1	39.3	11	20.76	9	70.2	31
19.0	0.94	2	70.5	25	3.40	4	28.3	10	34.82	3	38.0	13	20.74	2	66.8	34
29.0	1.00	6	67.7	28	3.50	10	27.5	8	34.90	8	36.5	15	20.78	4	63.3	35
ay 9.0	1.12	12	64.8	29	3.65	15	26.9	6	35.02	12	34.8	17	20.88	10	59.7	36
18.9	1.28	16	61.8	30	3.85	20	26.5	4	35.18	16	32.9	19	21.05	17	56.2	35
28.9	1.49	21	58.8	30	4.10	25	26.5	0	35.38	20	30.8	21	21.28	23	52.7	35
ne 7.9	1.74	25	55.8	30	4.39	29	26.8	3	35.62	24	28.7	21	21.56	28	49.3	34
17.9	2.02	28	53.0	28	4.71	32	27.4	6	35.89	27	26.5	22	21.89	33	46.2	31
27.8	2.33	31	50.4	26	5.06	35	28.3	9	36.18	29	24.3	22	22.26	37	43.5	27
ly 7.8	2.66	33	48.0	24	5.42	36	29.5	12	36.49	31	22.2	21	22.66	40	41.1	24
17.8	3.00	34	45.9	21	5.79	37	30.9	14	36.81	32	20.2	20	23.08	42	39.2	19
27.7	3.34	34	44.2	17	6.16	37	32.5	16	37.12	31	18.3	19	23.51	43	37.7	15
ug. 6.7	3.68	34	43.0	12	6.52	36	34.3	18	37.43	31	16.7	16	23.94	43	36.8	9
16.7	4.01	33	42.2	8	6.86	34	36.2	19	37.73	30	15.4	13	24.35	41	36.5	3
26.7	4.31	30	41.9	3	7.18	32	38.2	20	38.01	28	14.3	11	24.74	39	36.8	3
ept. 5.6	4.59	28	42.1	2	7.48	30	40.2	20	38.26	25	13.6	7	25.10	36	37.6	8
15.6	4.84	25	42.7	6	7.75	27	42.2	20	38.49	23	13.2	4	25.42	32	39.0	14
25.6	5.05	21	43.8	11	7.98	23	44.2	20	38.69	20	13.1	1	25.68	26	40.8	18
Oct. 5.6	5.22	17	45.2	14	8.18	20	46.2	20	38.86	17	13.3	2	25.89	21	43.0	22
15.5	5.35	13	47.0	18	8.35	17	48.0	18	39.00	14	13.8	5	26.05	16	45.6	26
25.5	5.45	10	49.0	20	8.48	13	49.7	17	39.11	11	14.5	7	26.14	9	48.3	27
Nov. 4.5	5.50	5	51.1	21	8.58	10	51.3	16	39.19	8	15.4	9	26.18	4	51.2	29
14.4	5.52	2	53.3	22	8.64	6	52.7	14	39.23	4	16.4	10	26.16	2	54.1	29
24.4	5.50	2	55.4	21	8.67	3	53.9	12	39.24	1	17.5	11	26.08	8	56.8	27
Dec. 4.4	5.45	5	57.4	20	8.66	1	54.9	10	39.23	1	18.6	11	25.96	12	59.3	25
14.4	5.37	8	59.3	19	8.62	4	55.7	8	39.19	4	19.6	10	25.79	17	61.5	22
24.3	5.26	11	60.8	15	8.54	8	56.2	5	39.13	6	20.6	10	25.59	20	63.2	17
34.3	5.13	13	62.0	12	8.44	10	56.4	2	39.05	8	21.5	9	25.35	24	64.5	13
δ, Tan δ	1.168		−0.604		1.198		+0.660		1.007		−0.120		1.621		−1.276	
Place	1ˢ.718		71″.66		4ˢ.699		26″.48		35ˢ.580		38″.37		21ˢ.849		69″.44	
ψα, D₀ α	−0.01		+0.03		+0.01		−0.04		0.00		+0.01		−0.02		+0.07	
ψδ, D₀ δ	+0.3		+0.5		+0.3		+0.5		+0.3		+0.5		+0.3		+0.5	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	o Ceti. Var. 1.7–9.6				κ Fornacis. Mag. 5.4				δ Hydri. Mag. 4.3				ι Cassiopeiæ. Mag. 4.6			
	Right Ascension.		Declination S.		Right Ascension.		Declination S.		Right Ascension.		Declination S.		Right Ascension.		Declination N.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	2 14		− 3 22		2 18		−24 12		2 20		−69 3		2 21		+67 0	
	s		″		s		″		s		″		s		″	
Jan. 0.3	54.17		36.6		31.37		64.1		13.36		50.2		47.88		45.1	
10.3	54.07	10	37.4	8	31.24	13	65.1	10	12.83	53	51.0	8	47.51	37	46.3	12
20.3	53.96	11	38.0	6	31.11	13	65.8	7	12.27	56	51.3	3	47.10	41	47.0	7
30.2	53.83	13	38.5	5	30.96	15	66.2	4	11.70	57	50.9	4	46.66	44	47.1	1
Feb. 9.2	53.70	13	38.8	3	30.80	16	66.2	0	11.14	56	49.9	10	46.20	46	46.7	4
19.2	53.57	13	39.0	2	30.64	16	65.8	4	10.59	55	48.4	15	45.75	45	45.8	9
29.2	53.45	12	39.0	0	30.50	14	65.1	7	10.08	51	46.4	20	45.33	42	44.4	14
Mar. 10.1	53.34	11	38.7	3	30.37	13	64.0	11	9.63	45	43.9	25	44.97	36	42.6	18
20.1	53.26	8	38.3	4	30.26	11	62.6	14	9.24	39	41.0	29	44.68	29	40.4	22
30.1	53.21	5	37.7	6	30.19	7	60.9	17	8.93	31	37.8	32	44.48	20	38.0	24
Apr. 9.0	53.20	1	36.8	9	30.16	3	58.9	20	8.71	22	34.3	35	44.37	11	35.5	25
19.0	53.23	3	35.7	11	30.17	1	56.6	23	8.58	13	30.6	37	44.38	1	33.0	25
29.0	53.30	7	34.4	13	30.23	6	54.2	24	8.55	3	26.8	38	44.49	11	30.6	24
May 9.0	53.42	12	32.8	16	30.34	11	51.6	26	8.63	8	23.0	38	44.71	22	28.3	23
18.9	53.58	16	31.1	17	30.49	15	48.9	27	8.81	18	19.3	37	45.04	33	26.3	20
28.9	53.79	21	29.2	19	30.69	20	46.1	28	9.09	28	15.7	36	45.46	42	24.6	17
June 7.9	54.03	24	27.2	20	30.92	23	43.3	28	9.46	37	12.3	34	45.97	51	23.3	13
17.9	54.30	27	25.1	21	31.19	27	40.6	27	9.92	46	9.2	31	46.54	57	22.4	9
27.8	54.59	29	23.0	21	31.49	30	38.0	26	10.45	53	6.5	27	47.16	62	22.0	4
July 7.8	54.89	30	21.0	20	31.81	32	35.7	23	11.04	59	4.2	23	47.82	66	22.1	1
17.8	55.21	32	19.0	20	32.13	32	33.6	21	11.68	64	2.4	18	48.50	68	22.6	5
27.7	55.53	32	17.2	18	32.46	33	31.8	18	12.33	65	1.2	12	49.19	69	23.5	9
Aug. 6.7	55.84	31	15.5	17	32.79	33	30.4	14	12.99	66	0.6	6	49.87	68	24.9	14
16.7	56.13	29	14.1	14	33.10	31	29.4	10	13.64	65	0.6	0	50.52	65	26.7	18
26.7	56.41	28	13.0	11	33.40	30	28.8	6	14.26	62	1.1	5	51.14	62	28.8	21
Sept. 5.6	56.67	26	12.1	9	33.67	27	28.7	1	14.82	56	2.3	12	51.72	58	31.3	25
15.6	56.90	23	11.6	5	33.92	25	29.0	3	15.32	50	4.1	18	52.24	52	34.0	27
25.6	57.10	20	11.3	3	34.13	21	29.7	7	15.74	42	6.3	22	52.70	46	37.0	30
Oct. 5.6	57.27	17	11.3	0	34.30	17	30.8	11	16.06	32	8.9	26	53.10	40	40.1	31
15.5	57.41	14	11.6	3	34.44	14	32.2	14	16.28	22	11.8	29	53.43	33	43.3	32
25.5	57.52	11	12.1	5	34.55	11	33.9	17	16.40	12	14.9	31	53.67	24	46.5	32
Nov. 4.5	57.60	8	12.8	7	34.63	8	35.8	19	16.40	0	18.0	31	53.83	16	49.7	32
14.4	57.65	5	13.7	9	34.67	4	37.7	19	16.30	10	21.1	31	53.91	8	52.8	31
24.4	57.67	2	14.6	9	34.67	0	39.6	19	16.10	20	24.1	30	53.90	1	55.7	29
Dec. 4.4	57.66	1	15.5	9	34.64	3	41.5	19	15.80	30	26.7	26	53.81	9	58.4	27
14.4	57.63	3	16.5	10	34.58	6	43.2	17	15.42	38	28.9	22	53.64	17	60.8	24
24.3	57.57	6	17.4	9	34.50	8	44.7	15	14.97	45	30.6	17	53.39	25	62.8	20
34.3	57.49	8	18.2	8	34.39	11	45.9	12	14.46	51	31.8	12	53.07	32	64.3	15
Sec δ, Tan δ	1.002		−0.059		1.097		−0.450		2.798		−2.613		2.561		+2.357	
Mean Place	$54^s.005$		36″.02		$30^s.922$		57″.36		$10^s.726$		34″.63		$47^s.998$		26″.85	
$D'_\psi \alpha$, $D_\omega \alpha$	0.00		0.00		−0.01		+0.02		−0.04		+0.14		+0.04		−0.13	
$D_\psi \delta$, $D_\omega \delta$	+0.3		+0.6		+0.3		+0.6		+0.3		+0.6		+0.3		+0.6	

FOR THE UPPER TRANSIT AT WASHINGTON.

an Solar Date.	ξ² Ceti. Mag. 4.3				σ Ceti. Mag. 4.8				36 H. Cassiopeiæ. Mag. 5.3				ν Ceti. Mag. 5.0			
	Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination N.	
	h m 2 23		° ′ + 8 3		h m 2 27		° ′ −15 37		h m 2 29		° ′ +72 25		h m 2 31		° ′ + 5 12	
	s		″		s		″		s		″		s		″	
n. 0.3	28.79		61.4		55.28		52.8		38.52		82.0		15.41		38.0	
10.3	28.70	9	60.8	6	55.17	11	53.8	10	38.03	49	83.5	15	15.32	9	37.4	6
20.3	28.59	11	60.3	5	55.05	12	54.5	7	37.47	56	84.4	9	15.22	10	36.8	6
30.2	28.47	12	59.8	5	54.91	14	55.0	5	36.87	60	84.7	3	15.09	13	36.3	5
eb. 9.2	28.33	14	59.3	5	54.77	14	55.2	2	36.25	62	84.5	2	14.96	13	35.9	4
19.2	28.20	13	58.9	4	54.62	15	55.1	1	35.64	61	83.7	8	14.82	14	35.6	3
29.2	28.08	12	58.6	3	54.48	14	54.7	4	35.07	57	82.4	13	14.69	13	35.3	3
lar. 10.1	27.97	11	58.4	2	54.36	12	54.0	7	34.57	50	80.6	18	14.57	12	35.2	1
20.1	27.88	9	58.3	1	54.26	10	53.1	9	34.15	42	78.4	22	14.48	9	35.2	0
30.1	27.83	5	58.3	0	54.19	7	51.8	13	33.85	30	76.0	24	14.42	6	35.4	2
pr. 9.1	27.81	2	58.5	2	54.16	3	50.3	15	33.68	17	73.4	26	14.40	2	35.8	4
19.0	27.83	2	58.9	4	54.17	1	48.5	18	33.64	4	70.7	27	14.42	2	36.4	6
29.0	27.90	7	59.6	7	54.22	5	46.5	20	33.74	10	68.1	26	14.48	6	37.2	8
lay 9.0	28.02	12	60.5	9	54.32	10	44.3	22	33.98	24	65.6	25	14.59	11	38.2	10
18.9	28.18	16	61.6	11	54.46	14	42.0	23	34.36	38	63.3	23	14.74	15	39.4	12
28.9	28.39	21	62.9	13	54.65	19	39.6	24	34.86	50	61.4	19	14.93	19	40.8	14
une 7.9	28.63	24	64.3	14	54.88	23	37.1	25	35.47	61	59.8	16	15.17	24	42.4	16
17.9	28.90	27	65.9	16	55.14	26	34.6	25	36.17	70	58.7	11	15.43	26	44.1	17
27.8	29.19	29	67.6	17	55.42	28	32.2	24	36.93	76	58.0	7	15.72	29	45.9	18
uly 7.8	29.50	31	69.4	18	55.72	30	29.9	23	37.75	82	57.8	2	16.02	30	47.7	18
17.8	29.82	32	71.3	19	56.04	32	27.8	21	38.60	85	58.0	2	16.34	32	49.6	19
27.8	30.14	32	73.1	18	56.36	32	26.0	18	39.46	86	58.8	8	16.66	32	51.4	18
ug. 6.7	30.45	31	74.8	17	56.67	31	24.5	15	40.32	86	60.0	12	16.97	31	53.1	17
16.7	30.76	31	76.4	16	56.98	31	23.3	12	41.16	84	61.6	16	17.28	31	54.6	15
26.7	31.05	29	77.8	14	57.27	29	22.4	9	41.96	80	63.6	20	17.56	28	55.9	13
ept. 5.6	31.31	26	79.0	12	57.54	27	21.9	5	42.70	74	66.0	24	17.83	27	57.0	11
15.6	31.55	24	80.0	10	57.78	24	21.9	0	43.38	68	68.7	27	18.07	24	57.9	9
25.6	31.76	21	80.8	8	57.99	21	22.2	3	43.98	60	71.6	29	18.29	22	58.6	7
ct. 5.6	31.94	18	81.4	6	58.17	18	22.9	7	44.50	52	74.8	32	18.48	19	59.0	4
15.5	32.10	16	81.8	4	58.32	15	23.9	10	44.92	42	78.1	33	18.64	16	59.2	2
25.5	32.23	13	82.0	2	58.44	12	25.1	12	45.25	33	81.4	33	18.77	13	59.2	0
ov. 4.5	32.32	9	82.0	0	58.53	9	26.5	14	45.47	22	84.8	34	18.87	10	59.0	2
14.5	32.38	6	81.8	2	58.59	6	28.0	15	45.58	11	88.1	33	18.94	7	58.6	4
24.4	32.42	4	81.5	3	58.61	2	29.6	16	45.57	1	91.3	32	18.98	4	58.1	5
ec. 4.4	32.43	1	81.2	3	58.60	1	31.1	15	45.45	12	94.2	29	18.99	1	57.6	5
14.4	32.41	2	80.7	5	58.56	4	32.6	15	45.22	23	96.8	26	18.97	2	57.0	6
24.3	32.36	5	80.2	5	58.49	7	33.9	13	44.88	34	99.0	22	18.93	4	56.4	6
34.3	32.28	8	79.7	5	58.40	9	35.0	11	44.44	44	100.8	18	18.86	7	55.8	6
δ, Tan δ	1.010		+0.142		1.038		−0.280		3.314		+3.160		1.004		+0.091	
n Place	$28^{s}.685$		58''.04		$54^{s}.909$		48''.98		$38^{s}.442$		63''.06		$15^{s}.241$		35''.30	
a, D_{ω} a	0.00		−0.01		0.00		+0.01		+0.05		−0.17		0.00		−0.01	
, D_{ω} δ	+0.3		+0.6		+0.3		+0.6		+0.3		+0.6		+0.3		+0.6	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	μ Hydri. Mag. 5.3				ν Arietis. Mag. 5.4				δ Ceti. Mag. 4.0				θ Persei. Mag. 4.2			
	Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination N.	
	h m 2 33		° ′ −79 29		h m 2 33		° ′ +21 34		h m 2 34		° ′ − 0 2		h m 2 38		° ′ +48 51	
	s		″		s		″		s		″		s		″	
Jan. 0.3	36.55	114	51.7	9	49.08	10	60.7	2	58.47	8	60.8	7	10.97	16	39.9	7
10.3	35.41	121	52.6	2	48.98	11	60.5	2	58.39	11	61.5	6	10.81	20	40.6	4
20.3	34.20	123	52.8	3	48.87	14	60.3	4	58.28	13	62.1	5	10.61	22	41.0	0
30.2	32.97	123	52.5	10	48.73	14	59.9	6	58.15	13	62.6	4	10.39	24	41.0	4
Feb. 9.2	31.74	119	51.5	15	48.59	15	59.3	6	58.02	14	63.0	3	10.15	23	40.6	8
19.2	30.55	112	50.0	21	48.44	14	58.7	7	57.88	13	63.3	1	9.92	23	39.8	11
29.2	29.43	102	47.9	25	48.30	13	58.0	6	57.75	12	63.4	1	9.69	20	38.7	14
Mar. 10.1	28.41	89	45.4	29	48.17	10	57.4	7	57.63	9	63.3	2	9.49	17	37.3	16
20.1	27.52	75	42.5	32	48.07	7	56.7	7	57.54	6	63.1	5	9.32	12	35.7	17
30.1	26.77	58	39.3	35	48.00	3	56.0	5	57.48	3	62.6	7	9.20	5	34.0	18
Apr. 9.1	26.19	41	35.8	37	47.97	2	55.5	3	57.45	1	61.9	9	9.15	0	32.2	18
19.0	25.78	21	32.1	37	47.99	7	55.2	2	57.46	5	61.0	11	9.15	7	30.4	17
29.0	25.57	2	28.4	38	48.06	11	55.0	0	57.51	10	59.9	13	9.22	14	28.7	15
May 9.0	25.55	18	24.6	38	48.17	17	55.0	3	57.61	15	58.6	15	9.36	21	27.2	13
18.9	25.73	37	20.8	36	48.34	21	55.3	5	57.76	19	57.1	17	9.57	27	25.9	10
28.9	26.10	55	17.2	33	48.55	25	55.8	8	57.95	22	55.4	18	9.84	32	24.9	6
June 7.9	26.65	72	13.9	31	48.80	28	56.6	9	58.17	26	53.6	19	10.16	37	24.3	3
17.9	27.37	87	10.8	27	49.08	30	57.5	12	58.43	28	51.7	20	10.53	40	24.0	0
27.8	28.24	100	8.1	22	49.38	33	58.7	14	58.71	30	49.7	20	10.93	43	24.0	4
July 7.8	29.24	110	5.9	17	49.71	34	60.1	15	59.01	32	47.7	19	11.36	44	24.4	8
17.8	30.34	116	4.2	12	50.05	34	61.6	16	59.33	31	45.8	18	11.80	45	25.2	11
27.8	31.50	120	3.0	6	50.39	33	63.2	17	59.64	31	44.0	17	12.25	44	26.3	14
Aug. 6.7	32.70	119	2.4	0	50.72	32	64.9	17	59.95	30	42.3	14	12.69	43	27.7	17
16.7	33.89	115	2.4	6	51.04	31	66.6	16	60.25	29	40.9	12	13.12	41	29.4	19
26.7	35.04	106	3.0	12	51.35	29	68.2	16	60.54	26	39.7	10	13.53	39	31.3	21
Sept. 5.6	36.10	96	4.2	18	51.64	26	69.8	15	60.80	25	38.7	7	13.92	36	33.4	23
15.6	37.06	80	6.0	22	51.90	23	71.3	14	61.05	22	38.0	4	14.28	32	35.7	23
25.6	37.86	62	8.2	26	52.13	21	72.7	12	61.27	19	37.6	1	14.60	28	38.0	24
Oct. 5.6	38.48	42	10.8	30	52.34	18	73.9	11	61.46	16	37.5	1	14.88	24	40.4	24
15.5	38.90	21	13.8	32	52.52	14	75.0	10	61.62	13	37.6	3	15.12	20	42.8	24
25.5	39.11	1	17.0	32	52.66	12	76.0	8	61.75	11	37.9	5	15.32	15	45.2	24
Nov. 4.5	39.10	24	20.2	31	52.78	8	76.8	6	61.86	7	38.4	7	15.47	10	47.6	22
14.5	38.86	45	23.3	30	52.86	5	77.4	5	61.93	4	39.1	8	15.57	6	49.8	21
24.4	38.41	65	26.3	27	52.91	2	77.9	4	61.97	1	39.9	8	15.63	1	51.9	19
Dec. 4.4	37.76	82	29.0	22	52.93	2	78.3	2	61.98	1	40.7	9	15.64	4	53.8	17
14.4	36.94	98	31.2	18	52.91	4	78.5	1	61.97	5	41.6	8	15.60	9	55.5	13
24.3	35.96	109	33.0	12	52.87	7	78.6	1	61.92	7	42.4	8	15.51	13	56.8	10
34.3	34.87		34.2		52.80		78.5		61.85		43.2		15.38		57.8	
Sec δ, Tan δ	5.483		−5.391		1.075		+0.396		1.000		−0.001		1.520		+1.145	
Mean Place	30ˢ.481		36″.51		48ˢ.998		52″.95		58ˢ.242		61″.91		10ˢ.945		24″.95	
D′ψ α, Dω α	−0.09		+0.28		+0.01		−0.02		0.00		0 00		+0.02		−0.06	
Dψ δ, Dω δ	+0.3		+0.6		+0.3		+0.6		+0.3		+0.6		+0.3		+0.6	

Mean Solar Date.	ε Hydri. Mag. 4.3				γ Ceti *seq.* Mag. 3.7				π Ceti. Mag. 4.4				μ Ceti. Mag. 4.4			
	Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination N.	
	h m 2 38		° ′ −68 38		h m 2 38		° ′ + 2 51		h m 2 39		° ′ −14 13		h m 2 40		° ′ + 9 44	
	s		″		s		″		s		″		s		″	
Jan. 0.3	16.69		52.2		44.58		57.8		56.41		54.1		11.14		39.8	
10.3	16.18	51	53.3	11	44.49	9	57.1	7	56.32	9	55.1	10	11.06	8	39.4	4
20.3	15.64	54	53.8	5	44.38	11	56.5	6	56.20	12	55.9	8	10.95	11	38.9	5
30.3	15.07	57	53.7	1	44.26	12	56.0	5	56.06	14	56.4	5	10.83	12	38.4	5
Feb. 9.2	14.50	57	53.1	6	44.13	13	55.6	4	55.92	14	56.7	3	10.70	13	37.9	5
19.2	13.95	55	51.8	13	43.99	14	55.3	3	55.77	15	56.7	0	10.56	14	37.5	4
29.2	13.42	53	50.0	18	43.86	13	55.1	2	55.62	15	56.4	3	10.42	14	37.1	4
Mar. 10.1	12.94	48	47.8	22	43.74	12	55.1	0	55.49	13	55.8	6	10.30	12	36.9	2
20.1	12.51	43	45.1	27	43.64	10	55.2	1	55.38	11	54.9	9	10.20	10	36.7	2
30.1	12.16	35	42.0	31	43.57	7	55.5	3	55.30	8	53.8	11	10.13	7	36.6	1
Apr. 9.1	11.89	27	38.6	34	43.54	3	56.0	5	55.26	4	52.4	14	10.10	3	36.8	2
19.0	11.72	17	35.1	35	43.55	1	56.7	7	55.26	0	50.7	17	10.11	1	37.1	3
29.0	11.64	8	31.4	37	43.60	5	57.6	9	55.30	4	48.8	19	10.17	6	37.6	5
May 9.0	11.67	3	27.6	38	43.70	10	58.8	12	55.39	9	46.7	21	10.27	10	38.4	8
19.0	11.80	13	23.8	38	43.84	14	60.1	13	55.52	13	44.4	23	10.42	15	39.3	9
28.9	12.03	23	20.1	37	44.03	19	61.6	15	55.70	18	42.1	23	10.61	19	40.4	11
June 7.9	12.35	32	16.6	35	44.25	22	63.3	17	55.92	22	39.7	24	10.84	23	41.8	14
17.9	12.77	42	13.4	32	44.51	26	65.1	18	56.17	25	37.2	25	11.10	26	43.2	14
27.8	13.26	49	10.5	29	44.79	28	66.9	18	56.44	27	34.8	24	11.39	29	44.9	17
July 7.8	13.81	55	8.1	24	45.09	30	68.8	19	56.74	30	32.6	22	11.70	31	46.6	17
17.8	14.41	60	6.1	20	45.40	31	70.6	18	57.05	31	30.5	21	12.02	32	48.3	17
27.8	15.04	63	4.6	15	45.72	32	72.4	18	57.37	32	28.6	19	12.34	32	50.0	17
Aug. 6.7	15.69	65	3.8	8	46.03	31	74.1	17	57.68	31	27.0	16	12.66	32	51.7	17
16.7	16.34	65	3.6	2	46.33	30	75.6	15	57.99	31	25.7	13	12.97	31	53.2	15
26.7	16.96	62	4.0	4	46.62	29	76.9	13	58.28	29	24.8	9	13.26	29	54.6	14
Sept. 5.7	17.53	57	4.9	9	46.89	27	77.9	10	58.56	28	24.3	5	13.54	28	55.9	13
15.6	18.05	52	6.4	15	47.14	25	78.7	8	58.81	25	24.2	1	13.79	25	56.9	10
25.6	18.50	45	8.5	21	47.36	22	79.2	5	59.03	22	24.4	2	14.02	23	57.8	9
Oct. 5.6	18.86	36	11.0	25	47.56	20	79.5	3	59.22	19	25.0	6	14.22	20	58.4	6
15.5	19.12	26	13.9	29	47.73	17	79.5	0	59.38	16	25.9	9	14.39	17	58.8	4
25.5	19.28	16	16.9	30	47.86	13	79.3	2	59.51	13	27.0	11	14.53	14	59.0	2
Nov. 4.5	19.33	5	20.1	32	47.96	10	79.0	3	59.61	10	28.4	14	14.64	11	59.1	1
14.5	19.28	5	23.3	32	48.04	8	78.5	5	59.68	7	29.9	15	14.73	9	59.0	1
24.4	19.12	16	26.4	31	48.09	5	77.9	6	59.71	3	31.4	15	14.78	5	58.8	2
Dec. 4.4	18.87	25	29.2	28	48.11	2	77.2	7	59.72	1	33.0	16	14.80	2	58.5	3
14.4	18.53	34	31.6	24	48.09	2	76.5	7	59.69	3	34.5	15	14.80	0	58.1	4
24.4	18.11	42	33.6	20	48.05	4	75.8	7	59.64	5	35.8	13	14.76	4	57.7	4
34.3	17.63	48	35.0	14	47.98	7	75.1	7	59.55	9	37.0	12	14.69	7	57.2	5
Sec δ, Tan δ	2.746		−2.557		1.001		+0.050		1.032		−0.254		1.015		+0.172	
Mean Place	13ˢ.894		38″.03		44ˢ.347		55″.62		56ˢ.000		51″.22		10ˢ.957		35″.52	
D′ψ α, Dω α	−0.04		+0.13		0.00		0.00		0.00		+0.01		0.00		−0.01	
Dψ δ, Dω δ	+0.3		+0.6		+0.3		+0.6		+0.3		+0.6		+0.3		+0.6	

APPARENT PLACES OF STARS, 1912.

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	η Persei. Mag. 3.9				41 Arietis. Mag. 3.7				β Fornacis. Mag. 4.5				σ Arietis. Mag. 5.5			
	Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination N.	
	h m 2 44		° ′ +55 31		h m 2 44		° ′ +26 53		h m 2 45		° ′ −32 45		h m 2 46		° ′ +14 43	
	s		″		s		″		s		″		s		″	
Jan. 0.3	16.26		67.9		48.12		63.8		25.21		98.1		38.07		17.6	
10.3	16.06	20	69.0	11	48.03	9	63.8	0	25.07	14	99.4	13	37.99	8	17.3	3
20.3	15.82	24	69.6	6	47.91	12	63.7	1	24.91	16	100.3	9	37.89	10	16.9	4
30.3	15.55	27	69.8	2	47.77	14	63.4	3	24.73	18	100.8	5	37.76	13	16.5	4
Feb. 9.2	15.26	29	69.5	3	47.61	16	63.0	4	24.54	19	100.8	0	37.62	14	16.0	5
19.2	14.97	29	68.8	7	47.45	16	62.4	6	24.35	19	100.4	4	37.47	15	15.5	5
29.2	14.69	28	67.7	11	47.30	15	61.6	8	24.17	18	99.6	8	37.33	14	15.0	5
Mar. 10.1	14.44	25	66.2	15	47.16	14	60.8	8	24.00	17	98.4	12	37.21	12	14.6	4
20.1	14.23	21	64.5	17	47.04	12	60.0	8	23.85	15	96.8	16	37.11	10	14.2	4
30.1	14.07	16	62.6	19	46.96	8	59.1	9	23.74	11	94.9	19	37.04	7	14.0	2
Apr. 9.1	13.98	9	60.6	20	46.92	4	58.3	8	23.67	7	92.6	23	37.00	4	13.9	1
19.0	13.97	1	58.5	21	46.93	1	57.6	7	23.64	3	90.1	25	37.00	0	13.9	0
29.0	14.04	7	56.5	20	46.99	6	57.1	5	23.66	2	87.3	28	37.05	5	14.1	2
May 9.0	14.18	14	54.6	19	47.10	11	56.8	3	23.73	7	84.4	29	37.15	10	14.5	4
19.0	14.40	22	53.0	16	47.26	16	56.7	1	23.85	12	81.3	31	37.29	14	15.1	6
28.9	14.69	29	51.6	14	47.46	20	56.9	2	24.02	17	78.2	31	37.48	19	15.9	8
June 7.9	15.04	35	50.6	10	47.71	25	57.3	4	24.23	21	75.1	31	37.71	23	17.0	11
17.9	15.44	40	50.0	6	48.00	29	58.0	7	24.48	25	72.1	30	37.97	26	18.3	13
27.8	15.89	45	49.7	3	48.31	31	58.9	9	24.77	29	69.3	28	38.26	29	19.7	14
July 7.8	16.37	48	49.9	2	48.64	33	60.0	11	25.08	31	66.8	25	38.57	31	21.2	15
17.8	16.87	50	50.4	5	48.99	35	61.3	13	25.41	33	64.5	23	38.89	32	22.8	16
27.8	17.38	51	51.3	9	49.34	35	62.8	15	25.75	34	62.6	19	39.22	33	24.4	16
Aug. 6.7	17.88	50	52.5	12	49.69	35	64.3	15	26.10	35	61.2	14	39.55	33	26.0	16
16.7	18.37	49	54.1	16	50.03	34	65.9	16	26.44	34	60.2	10	39.86	31	27.6	16
26.7	18.84	47	55.9	18	50.35	32	67.6	17	26.76	32	59.7	5	40.16	30	29.1	15
Sept. 5.7	19.29	45	58.0	21	50.65	30	69.2	16	27.06	30	59.7	0	40.44	28	30.4	13
15.6	19.70	41	60.3	23	50.93	28	70.8	16	27.33	27	60.2	5	40.70	26	31.6	12
25.6	20.07	37	62.8	25	51.18	25	72.4	16	27.58	25	61.1	9	40.94	24	32.6	10
Oct. 5.6	20.40	33	65.4	26	51.41	23	73.8	14	27.79	21	62.5	14	41.15	21	33.5	9
15.5	20.68	28	68.1	27	51.61	20	75.2	14	27.96	17	64.3	18	41.34	19	34.2	7
25.5	20.91	23	70.8	27	51.77	16	76.4	12	28.09	13	66.4	21	41.49	15	34.7	5
Nov. 4.5	21.09	18	73.4	26	51.90	13	77.5	11	28.19	10	68.7	23	41.61	12	35.0	3
14.5	21.21	12	76.0	26	52.00	10	78.4	9	28.25	6	71.1	24	41.70	9	35.2	2
24 4	21.27	6	78.5	25	52.06	6	79.3	9	28.26	1	73.4	23	41.77	7	35.3	1
Dec. 4.4	21.28	1	80.7	22	52.09	3	79.9	6	28.24	2	75.7	23	41.80	3	35.3	0
14.4	21.22	6	82.7	20	52.09	0	80.4	5	28.19	5	77.8	21	41.79	1	35.1	2
24.4	21.11	11	84.4	17	52.05	4	80.8	4	28.10	9	79.7	19	41.76	3	34.9	2
34.3	20.95	16	85.6	12	51.97	8	81.0	2	27.97	13	81.2	15	41.70	6	34.6	3
Sec δ, Tan δ	1.767		+1.457		1.121		+0.507		1.189		−0.644		1.034		+0.263	
Mean Place	16ˢ.158		51″.65		48ˢ.008		54″.34		24ˢ.456		90″.54		37ˢ.888		11″.64	
D′ψ α, Dω α	+0.03		−0.07		+0.01		−0.03		−0.01		+0.03		0.00		−0.01	
Dψ δ, Dω δ	+0.3		+0.7		+0.3		+0.7		+0.3		+0.7		+0.3		+0.7	

FOR THE UPPER TRANSIT AT WASHINGTON.

lar	**τ² Eridani.** Mag. 4.8				**τ Persei.** Mag. 4.1				**η Eridani.** Mag. 4.0				**ε Arietis (*mean*).** Mag. 4.6			
	Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination N.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	2 47		−21 21		2 47		+52 24		2 52		− 9 14		2 54		+20 59	
	s		″		s		″		s		″		s		″	
.3	3.28	11	62.8	12	60.75	17	26.6	10	8.09	9	53.2	10	10.80	8	28.0	1
.3	3.17	13	64.0	9	60.58	21	27.6	6	8.00	11	54.2	8	10.72	11	27.9	2
.3	3.04	14	64.9	5	60.37	25	28.2	2	7.89	13	55.0	6	10.61	13	27.7	3
.3	2.90	16	65.4	2	60.12	26	28.4	3	7.76	14	55.6	4	10.48	15	27.4	5
.2	2.74	17	65.6	1	59.86	26	28.1	7	7.62	14	56.0	1	10.33	15	26.9	5
.2	2.57	16	65.5	4	59.60	26	27.4	10	7.48	15	56.1	1	10.18	15	26.4	5
.2	2.41	14	65.1	8	59.34	24	26.4	14	7.33	14	56.0	4	10.03	14	25.9	6
.2	2.27	12	64.3	12	59.10	19	25.0	16	7.19	11	55.6	6	9.89	11	25.3	6
.1	2.15	9	63.1	15	58.91	14	23.4	18	7.08	8	55.0	9	9.78	8	24.7	6
.1	2.06	6	61.6	17	58.77	8	21.6	19	7.00	5	54.1	11	9.70	5	24.1	5
.1	2.00	2	59.9	20	58.69	2	19.7	20	6.95	1	53.0	14	9.65	0	23.6	3
.0	1.98	3	57.9	22	58.67	6	17.7	19	6.94	3	51.6	16	9.65	5	23.3	2
.0	2.01	8	55.7	24	58.73	13	15.8	17	6.97	8	50.0	18	9.70	9	23.1	1
.0	2.09	12	53.3	26	58.86	20	14.1	14	7.05	13	48.2	19	9.79	14	23.2	3
.0	2.21	17	50.7	27	59.06	27	12.7	12	7.18	17	46.3	21	9.93	19	23.5	4
.9	2.38	21	48.0	27	59.33	33	11.5	9	7.35	20	44.2	22	10.12	23	23.9	6
.9	2.59	24	45.3	27	59.66	38	10.6	6	7.55	24	42.0	23	10.35	27	24.5	9
.9	2.83	27	42.6	26	60.04	42	10.0	2	7.79	27	39.7	22	10.62	30	25.4	11
.9	3.10	30	40.0	24	60.46	45	9.8	2	8.06	29	37.5	22	10.92	31	26.5	13
.8	3.40	32	37.6	22	60.91	47	10.0	6	8.35	31	35.3	21	11.23	33	27.8	14
.8	3.72	32	35.4	19	61.38	48	10.6	9	8.66	32	33.2	18	11.56	34	29.2	15
.8	4.04	32	33.5	15	61.86	47	11.5	13	8.98	31	31.4	16	11.90	33	30.7	15
.7	4.36	32	32.0	12	62.33	46	12.8	15	9.29	30	29.8	14	12.23	33	32.2	16
.7	4.68	30	30.8	8	62.79	45	14.3	18	9.59	29	28.4	10	12.56	32	33.8	15
.7	4.98	28	30.0	3	63.24	42	16.1	21	9.88	28	27.4	7	12.88	29	35.3	14
.7	5.26	26	29.7	1	63.66	39	18.2	22	10.16	26	26.7	3	13.17	28	36.7	14
.6	5.52	23	29.8	5	64.05	35	20.4	23	10.42	23	26.4	0	13.45	25	38.1	13
.6	5.75	20	30.3	9	64.40	31	22.7	25	10.65	20	26.4	3	13.70	22	39.4	11
.6	5.95	17	31.2	13	64.71	27	25.2	25	10.85	17	26.7	7	13.92	19	40.5	10
.6	6.12	14	32.5	15	64.98	22	27.7	26	11.02	15	27.4	9	14.11	17	41.5	8
.5	6.26	10	34.0	18	65.20	18	30.3	25	11.17	11	28.3	11	14.28	14	42.3	7
.5	6.36	7	35.8	19	65.38	13	32.8	24	11.28	8	29.4	13	14.42	11	43.0	6
.5	6.43	3	37.7	19	65.51	7	35.2	22	11.36	5	30.7	13	14.53	7	43.6	5
.4	6.46	0	39.6	19	65.58	2	37.4	21	11.41	2	32.0	13	14.60	4	44.1	3
.4	6.46	3	41.5	17	65.60	4	39.5	19	11.43	1	33.3	13	14.64	0	44.4	2
.4	6.43	6	43.2	16	65.56	9	41.4	15	11.42	4	34.6	13	14.64	3	44.6	1
.4	6.37	9	44.8	14	65.47	14	42.9	12	11.38	7	35.9	11	14.61	6	44.7	0
.3	6.28		46.2		65.33		44.1		11.31		37.0		14.55		44.7	
δ	1.074		−0.391		1.639		+1.299		1.013		−0.163		1.071		+0.384	
ce	2ˢ.733		58″.26		60ˢ.630		11″.03		7ˢ.678		52″.26		10ˢ.609		20″.11	
a	−0.01		+0.02		+0.02		−0.06		0.00		+0.01		+0.01		−0.02	
	+0.3		+0.7		+0.3		+0.7		+0.3		+0.7		+0.3		+0.7	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	47 H. Cephei. Mag. 5.7				θ Eridani. Mag. 3.4				α Ceti. Mag. 2.8				γ Persei. Mag. 3.1			
	Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination N.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	2 54		+79 4		2 54		−40 38		2 57		+ 3 44		2 58		+53 9	
	s		″		s		″		s		″		s		″	
Jan. 0.3	21.45	77	39.3	19	56.60	17	93.6	14	40.97	8	45.2	7	25.12	17	61.1	11
10.3	20.68	89	41.2	14	56.43	19	95.0	10	40.89	10	44.5	6	24.95	21	62.2	7
20.3	19.79	99	42.6	8	56.24	21	96.0	5	40.79	12	43.9	5	24.74	24	62.9	3
30.3	18.80	103	43.4	2	56.03	23	96.5	0	40.67	13	43.4	4	24.50	27	63.2	1
Feb. 9.2	17.77	104	43.6	4	55.80	23	96.5	4	40.54	14	43.0	3	24.23	27	63.1	6
19.2	16.73	99	43.2	10	55.57	22	96.1	9	40.40	14	42.7	2	23.96	27	62.5	9
29.2	15.74	90	42.2	15	55.35	20	95.2	14	40.26	13	42.5	1	23.69	25	61.6	13
Mar. 10.2	14.84	78	40.7	20	55.15	18	93.8	18	40.13	11	42.4	1	23.44	21	60.3	16
20.1	14.06	61	38.7	24	54.97	15	92.0	22	40.02	9	42.5	2	23.23	16	58.7	17
30.1	13.45	42	36.3	26	54.82	11	89.8	25	39.93	5	42.7	4	23.07	10	57.0	19
Apr. 9.1	13.03	22	33.7	27	54.71	6	87.3	28	39.88	1	43.1	6	22.97	3	55.1	20
19.0	12.81	1	31.0	28	54.65	0	84.5	30	39.87	4	43.7	9	22.94	5	53.1	19
29.0	12.82	23	28.2	28	54.65	5	81.5	32	39.91	8	44.6	11	22.99	12	51.2	17
May 9.0	13.05	44	25.4	26	54.70	10	78.3	33	39.99	13	45.7	12	23.11	19	49.5	16
19.0	13.49	63	22.8	23	54.80	16	75.0	33	40.12	17	46.9	14	23.30	26	47.9	13
28.9	14.12	82	20.5	20	54.96	21	71.7	33	40.29	21	48.3	16	23.56	32	46.6	10
June 7.9	14.94	98	18.5	17	55.17	26	68.4	32	40.50	25	49.9	17	23.88	37	45.6	7
17.9	15.92	110	16.8	12	55.43	29	65.2	30	40.75	27	51.6	18	24.25	42	44.9	3
27.9	17.02	121	15.6	7	55.72	32	62.2	27	41.02	29	53.4	18	24.67	45	44.6	1
July 7.8	18.23	128	14.9	2	56.04	34	59.5	23	41.31	31	55.2	18	25.12	47	44.7	4
17.8	19.51	132	14.7	2	56.38	36	57.2	19	41.62	31	57.0	17	25.59	48	45.1	8
27.8	20.83	134	14.9	7	56.74	37	55.3	14	41.93	31	58.7	16	26.07	48	45.9	11
Aug. 6.7	22.17	132	15.6	12	57.11	36	53.9	9	42.24	31	60.3	15	26.55	47	47.0	14
16.7	23.49	129	16.8	16	57.47	35	53.0	4	42.55	30	61.8	13	27.02	46	48.4	17
26.7	24.78	122	18.4	20	57.82	33	52.6	2	42.85	28	63.1	10	27.48	44	50.1	19
Sept. 5.7	26.00	114	20.4	24	58.15	30	52.8	7	43.13	26	64.1	8	27.92	41	52.0	21
15.6	27.14	104	22.8	28	58.45	27	53.5	12	43.39	23	64.9	5	28.33	37	54.1	23
25.6	28.18	91	25.6	30	58.72	23	54.7	16	43.62	21	65.4	3	28.70	33	56.4	24
Oct. 5.6	29.09	77	28.6	33	58.95	19	56.3	21	43.83	18	65.7	1	29.03	29	58.8	25
15.6	29.86	62	31.9	34	59.14	15	58.4	24	44.01	16	65.8	2	29.32	25	61.3	25
25.5	30.48	45	35.3	34	59.29	10	60.8	26	44.17	13	65.6	4	29.57	20	63.8	25
Nov. 4.5	30.93	26	38.7	35	59.39	6	63.4	27	44.30	10	65.2	5	29.77	14	66.3	24
14.5	31.19	7	42.2	34	59.45	1	66.1	27	44.40	7	64.7	6	29.91	9	68.7	23
24.4	31.26	12	45.6	33	59.46	3	68.8	25	44.47	3	64.1	7	30.00	3	71.0	21
Dec. 4.4	31.14	32	48.9	30	59.43	8	71.3	24	44.50	0	63.4	7	30.03	2	73.1	19
14.4	30.82	50	51.9	26	59.35	11	73.7	21	44.50	3	62.7	7	30.01	8	75.0	17
24.4	30.32	67	54.5	22	59.24	14	75.8	17	44.47	6	62.0	7	29.93	13	76.7	13
34.3	29.65		56.7		59.10		77.5		44.41		61.3		29.80		78.0	
Sec δ, Tan δ	5.277		+5.182		1.319		−0.859		1.002		+0.065		1.668		+1.335	
Mean Place	20ˢ.380		19″.97		55ˢ.581		84″.85		40ˢ.657		42″.15		24ˢ.898		45″.46	
D′ψ α, Dω α	+0.09		−0.25		−0.02		+0.04		0.00		0.00		+0.02		−0.06	
Dψ δ, Dω δ	+0.3		+0.7		+0.3		+0.7		+0.3		+0.7		+0.3		+0.7	

Mean Solar Date.	τ^3 Eridani. Mag. 4.2				ρ Persei. Var. 3.4–4.2				μ Horologii. Mag. 5.2				θ Hydri. Mag. 5.5			
	Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination S.	
	h m 2 58 s		° ′ −23 57 ″		h m 2 59 s		° ′ +38 29 ″		h m 3 1 s		° ′ −60 4 ″		h m 3 2 s		° ′ −72 14 ″	
Jan. 0.3	31.37	11	72.5	13	32.13	11	72.1	5	34.19	33	54.4	16	7.61	61	58.6	13
10.3	31.26	13	73.8	10	32.02	14	72.6	3	33.86	36	56.0	9	7.00	67	59.9	9
20.3	31.13	15	74.8	6	31.88	17	72.9	0	33.50	38	56.9	4	6.33	70	60.8	2
30.3	30.98	17	75.4	2	31.71	18	72.9	3	33.12	40	57.3	2	5.63	72	61.0	4
Feb. 9.2	30.81	17	75.6	1	31.53	20	72.6	6	32.72	40	57.1	7	4.91	72	60.6	10
19.2	30.64	17	75.5	5	31.33	19	72.0	8	32.32	39	56.4	13	4.19	69	59.6	15
29.2	30.47	16	75.0	8	31.14	17	71.2	10	31.93	37	55.1	18	3.50	64	58.1	20
Mar. 10.2	30.31	14	74.2	12	30.97	15	70.2	12	31.56	33	53.3	23	2.86	58	56.1	25
20.1	30.17	11	73.0	15	30.82	11	69.0	12	31.23	27	51.0	27	2.28	51	53.6	29
30.1	30.06	7	71.5	18	30.71	7	67.8	13	30.96	22	48.3	30	1.77	41	50.7	32
Apr. 9.1	29.99	3	69.7	21	30.64	1	66.5	13	30.74	16	45.3	33	1.36	30	47.5	35
19.0	29.96	2	67.6	23	30.63	4	65.2	12	30.58	8	42.0	35	1.06	19	44.0	36
29.0	29.98	6	65.3	25	30.67	10	64.0	10	30.50	0	38.5	36	0.87	8	40.4	37
May 9.0	30.04	10	62.8	27	30.77	16	63.0	8	30.50	8	34.9	37	0.79	5	36.7	38
19.0	30.14	16	60.1	27	30.93	22	62.2	5	30.58	16	31.2	37	0.84	18	32.9	37
28.9	30.30	20	57.4	28	31.15	26	61.7	3	30.74	22	27.5	35	1.02	29	29.2	35
June 7.9	30.50	23	54.6	28	31.41	30	61.4	0	30.96	30	24.0	34	1.31	40	25.7	33
17.9	30.73	27	51.8	26	31.71	34	61.4	3	31.26	36	20.6	31	1.71	51	22.4	30
27.9	31.00	30	49.2	25	32.05	37	61.7	6	31.62	41	17.5	27	2.22	58	19.4	26
July 7.8	31.30	31	46.7	23	32.42	38	62.3	8	32.03	45	14.8	24	2.80	66	16.8	22
17.8	31.61	32	44.4	19	32.80	39	63.1	11	32.48	48	12.4	18	3.46	71	14.6	17
27.8	31.93	32	42.5	16	33.19	39	64.2	13	32.96	49	10.6	12	4.17	74	12.9	11
Aug. 6.7	32.25	32	40.9	12	33.58	38	65.5	15	33.45	50	9.4	7	4.91	75	11.8	5
16.7	32.57	31	39.7	8	33.96	36	67.0	16	33.95	48	8.7	0	5.66	74	11.3	1
26.7	32.88	29	38.9	3	34.32	35	68.6	18	34.43	46	8.7	5	6.40	70	11.4	8
Sept. 5.7	33.17	27	38.6	2	34.67	33	70.4	18	34.89	42	9.2	12	7.10	64	12.2	14
15.6	33.44	24	38.8	6	35.00	30	72.2	18	35.31	37	10.4	17	7.74	56	13.6	19
25.6	33.68	21	39.4	10	35.30	26	74.0	19	35.68	32	12.1	22	8.30	48	15.5	23
Oct. 5.6	33.89	18	40.4	13	35.56	24	75.9	18	36.00	26	14.3	26	8.78	36	17.8	28
15.6	34.07	15	41.7	17	35.80	20	77.7	18	36.26	18	16.9	29	9.14	24	20.6	31
25.5	34.22	11	43.4	19	36.00	16	79.5	17	36.44	11	19.8	31	9.38	12	23.7	32
Nov. 4.5	34.33	8	45.3	20	36.16	13	81.2	17	36.55	3	22.9	32	9.50	2	26.9	33
14.5	34.41	4	47.3	21	36.29	9	82.9	15	36.58	4	26.1	31	9.48	15	30.2	32
24.4	34.45	1	49.4	21	36.38	4	84.4	13	36.54	12	29.2	29	9.33	27	33.4	30
Dec. 4.4	34.46	3	51.5	19	36.42	1	85.7	12	36.42	18	32.1	27	9.06	38	36.4	26
14.4	34.43	6	53.4	17	36.43	4	86.9	9	36.24	24	34.8	23	8.68	48	39.0	22
24.4	34.37	9	55.1	15	36.39	8	87.8	7	36.00	30	37.1	18	8.20	57	41.2	18
34.3	34.28		56.6		36.31		88.5		35.70		38.9		7.63		43.0	
Sec δ, Tan δ	1.094		−0.444		1.278		+0.795		2.005		−1.737		3.279		−3.123	
Mean Place	$30^{s}.721$		$67''.83$		$31^{s}.942$		$59''.55$		$32^{s}.139$		$42''.98$		$3^{s}.825$		$45''.99$	
$D'_{\psi}\alpha$, $D_{\omega}\alpha$	−0.01		+0.02		+0.01		−0.04		−0.03		+0.08		−0.06		+0.15	
$D_{\psi}\delta$, $D_{\omega}\delta$	+0.3		+0.7		+0.3		+0.7		+0.3		+0.7		+0.3		+0.7	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	β Persei. Var. 2.1–3.2				δ Arietis. Mag. 4.5				12 Eridani. Mag. 4.0				48 H. Cephei. Mag. 5.5			
	Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination N.	
	h m 3 2		° ′ +40 37		h m 3 6		° ′ +19 23		h m 3 8		° ′ −29 19		h m 3 9		° ′ +77 24	
	s		″		s		″		s		″		s		″	
Jan. 0.4	26.46		15.4		35.93		48.0		20.72		66.2		8.13		64.7	
10.3	26.35	11	16.0	6	35.85	8	47.9	1	20.60	12	67.7	15	7.52	61	66.7	20
20.3	26.21	14	16.4	4	35.75	10	47.7	2	20.46	14	68.8	11	6.80	72	68.2	15
30.3	26.03	18	16.5	1	35.62	13	47.4	3	20.29	17	69.4	6	5.98	82	69.2	10
Feb. 9.2	25.84	19	16.2	3	35.48	14	47.0	4	20.11	18	69.7	3	5.10	88	69.5	3
19.2	25.64	20	15.7	5	35.33	15	46.6	4	19.92	19	69.6	1	4.21	89	69.3	2
29.2	25.44	20	14.9	8	35.18	15	46.1	5	19.74	18	69.0	6	3.34	87	68.5	8
Mar. 10.2	25.25	19	13.8	11	35.03	15	45.6	5	19.56	18	68.1	9	2.54	80	67.1	14
20.1	25.10	15	12.6	12	34.91	12	45.1	5	19.41	15	66.8	13	1.83	71	65.3	18
30.1	24.98	12	11.3	13	34.82	9	44.6	5	19.28	13	65.1	17	1.26	57	63.1	22
Apr. 9.1	24.91	7	9.9	14	34.76	6	44.2	4	19.19	9	63.1	20	0.85	41	60.6	25
19.1	24.89	2	8.6	13	34.75	1	44.0	2	19.14	5	60.8	23	0.62	23	58.0	26
29.0	24.93	4	7.3	13	34.78	3	43.9	1	19.14	0	58.2	26	0.58	4	55.2	28
May 9.0	25.03	10	6.1	12	34.86	8	44.0	1	19.19	5	55.5	27	0.73	15	52.5	27
19.0	25.19	16	5.2	9	34.99	13	44.3	3	19.28	9	52.6	29	1.07	34	49.9	26
28.9	25.40	21	4.5	7	35.17	18	44.8	5	19.42	14	49.6	30	1.58	51	47.5	24
June 7.9	25.67	27	4.1	4	35.39	22	45.5	7	19.61	19	46.6	30	2.26	68	45.4	21
17.9	25.98	31	4.0	1	35.65	26	46.4	9	19.84	23	43.6	30	3.09	83	43.7	17
27.9	26.32	34	4.2	2	35.94	29	47.5	11	20.11	27	40.8	28	4.03	94	42.4	13
July 7.8	26.69	37	4.7	5	36.25	31	48.8	13	20.41	30	38.2	26	5.07	104	41.5	9
17.8	27.08	39	5.5	8	36.57	32	50.1	13	20.72	31	35.8	24	6.19	112	41.1	4
27.8	27.48	40	6.5	10	36.90	33	51.5	14	21.04	32	33.8	20	7.35	116	41.1	0
Aug. 6.8	27.87	39	7.7	12	37.23	33	53.0	15	21.37	33	32.2	16	8.53	118	41.6	5
16.7	28.26	39	9.2	15	37.56	33	54.5	15	21.70	33	31.0	12	9.71	118	42.6	10
26.7	28.64	38	10.8	16	37.88	32	56.0	15	22.02	32	30.3	7	10.87	116	44.1	15
Sept. 5.7	29.00	36	12.5	17	38.18	30	57.3	13	22.33	31	30.0	3	11.98	111	45.9	18
15.6	29.34	34	14.3	18	38.46	28	58.6	13	22.61	28	30.3	3	13.02	104	48.1	22
25.6	29.65	31	16.2	19	38.72	26	59.7	11	22.87	26	31.0	7	13.98	96	50.6	25
Oct. 5.6	29.93	28	18.2	20	38.95	23	60.7	10	23.10	23	32.2	12	14.84	86	53.5	29
15.6	30.17	24	20.1	19	39.15	20	61.6	9	23.29	19	33.8	16	15.59	75	56.6	31
25.5	30.38	21	22.0	19	39.33	18	62.3	7	23.45	16	35.7	19	16.20	61	59.8	32
Nov. 4.5	30.55	17	23.8	18	39.48	15	62.8	5	23.57	12	37.8	21	16.67	47	63.1	33
14.5	30.68	13	25.6	18	39.60	12	63.3	5	23.65	8	40.1	23	16.99	32	66.5	34
24.5	30.77	9	27.2	16	39.69	9	63.6	3	23.70	5	42.4	23	17.14	15	69.9	34
Dec. 4.4	30.82	5	28.6	14	39.74	5	63.8	2	23.71	1	44.7	23	17.11	3	73.1	32
14.4	30.82	0	29.9	13	39.76	2	64.0	2	23.68	3	46.9	22	16.92	19	76.1	30
24.4	30.78	4	31.0	11	39.74	2	64.0	0	23.62	6	48.8	19	16.56	36	78.8	27
34.3	30.70	8	31.8	8	39.68	6	63.9	1	23.52	10	50.4	16	16.04	52	81.1	23
Sec δ, Tan δ	1.317		+0.858		1.060		+0.352		1.147		−0.562		4.589		+4.479	
Mean Place	26ˢ.258		2″.37		35ˢ.658		40″.43		19ˢ.922		60″.85		6ˢ.868		45″.80	
D′ψ α, Dω α	+0.02		−0.04		+0.01		−0.02		−0.01		+0.03		+0.09		−0.20	
Dψ δ Dω δ	+0.3		+0.7		+0.3		+0.7		+0.3		+0.7		+0.3		+0.7	

Mean Solar Date.	ζ Arietis. Mag. 5.0				38 Horologii (G.). Mag. 5.7				ζ Eridani. Mag. 4.9				τ Arietis. Mag. 5.2			
	Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination S.		Right Ascension.		Declination N.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	3 9		+20 43		3 10		−57 38		3 11		− 9 8		3 16		+20 49	
	s		″		s		″		s		″		s		″	
Jan. 0.4	50.69		16.0		21.14		73.6		33.97		45.7		8.94		57.6	
10.3	50.62	7	15.9	1	20.85	29	75.3	17	33.89	8	46.7	10	8.88	6	57.6	0
20.3	50.52	10	15.7	2	20.53	32	76.4	11	33.79	10	47.6	9	8.78	10	57.4	2
30.3	50.39	13	15.5	2	20.18	35	76.9	5	33.66	13	48.3	7	8.65	13	57.2	2
Feb. 9.2	50.24	15	15.1	4	19.81	37	76.9	0	33.51	15	48.7	4	8.51	14	56.8	4
19.2	50.08	16	14.7	4	19.44	37	76.3	6	33.36	15	48.9	2	8.35	16	56.4	4
29.2	49.93	15	14.2	5	19.07	37	75.2	11	33.21	15	48.8	1	8.19	16	55.9	5
Mar. 10.2	49.79	14	13.6	6	18.73	34	73.5	17	33.07	14	48.5	3	8.04	15	55.4	5
20.1	49.67	12	13.1	5	18.42	31	71.4	21	32.94	13	48.0	5	7.92	12	54.9	5
30.1	49.57	10	12.6	5	18.15	27	68.9	25	32.84	10	47.2	8	7.81	11	54.4	5
Apr. 9.1	49.51	6	12.1	5	17.94	21	66.0	29	32.77	7	46.1	11	7.75	6	54.0	4
19.1	49.49	2	11.8	3	17.79	15	62.8	32	32.74	3	44.8	13	7.73	2	53.6	4
29.0	49.52	3	11.6	2	17.70	9	59.4	34	32.76	2	43.2	16	7.75	2	53.4	2
May 9.0	49.60	8	11.6	0	17.69	1	55.8	36	32.82	6	41.5	17	7.82	7	53.4	0
19.0	49.73	13	11.9	3	17.76	7	52.2	36	32.93	11	39.5	20	7.95	13	53.6	2
28.9	49.90	17	12.3	4	17.89	13	48.5	37	33.08	15	37.5	20	8.12	17	54.0	4
June 7.9	50.12	22	12.9	6	18.10	21	44.9	36	33.27	19	35.3	22	8.33	21	54.6	6
17.9	50.38	26	13.7	8	18.37	27	41.5	34	33.49	22	33.1	22	8.58	25	55.4	8
27.9	50.66	28	14.7	10	18.70	33	38.4	31	33.75	26	30.9	22	8.86	28	56.4	10
July 7.8	50.97	31	15.9	12	19.08	38	35.6	28	34.03	28	28.7	22	9.17	31	57.5	11
17.8	51.30	33	17.2	13	19.50	42	33.2	24	34.33	30	26.6	21	9.49	32	58.8	13
27.8	51.63	33	18.6	14	19.95	45	31.2	20	34.64	31	24.7	19	9.82	33	60.1	13
Aug. 6.8	51.97	34	20.0	14	20.41	46	29.8	14	34.95	31	23.1	16	10.16	34	61.5	14
16.7	52.30	33	21.5	15	20.88	47	29.0	8	35.25	30	21.7	14	10.49	33	62.9	14
26.7	52.62	32	22.9	14	21.34	46	28.8	2	35.55	30	20.7	10	10.81	32	64.3	14
Sept. 5.7	52.92	30	24.2	13	21.78	44	29.2	4	35.84	29	20.0	7	11.12	31	65.7	14
15.6	53.20	28	25.5	13	22.19	41	30.2	10	36.10	26	19.6	4	11.41	29	66.9	12
25.6	53.46	26	26.7	12	22.56	37	31.7	15	36.34	24	19.6	0	11.68	27	68.0	11
Oct. 5.6	53.70	24	27.7	10	22.87	31	33.8	21	36.56	22	19.9	3	11.92	24	69.0	10
15.6	53.91	21	28.6	9	23.12	25	36.4	26	36.76	20	20.6	7	12.13	21	69.9	9
25.5	54.10	19	29.4	8	23.31	19	39.3	29	36.92	16	21.5	9	12.32	19	70.7	8
Nov. 4.5	54.25	15	30.1	7	23.44	13	42.3	30	37.05	13	22.6	11	12.48	16	71.3	6
14.5	54.37	12	30.6	5	23.50	6	45.4	31	37.15	10	23.9	13	12.61	13	71.8	5
24.5	54.46	9	31.0	4	23.48	2	48.6	32	37.22	7	25.3	14	12.71	10	72.2	4
Dec. 4.4	54.52	6	31.3	3	23.39	9	51.6	30	37.26	4	26.7	14	12.77	6	72.5	3
14.4	54.54	2	31.5	2	23.24	15	54.3	27	37.26	0	28.1	14	12.79	2	72.7	2
24.4	54.52	2	31.5	0	23.04	20	56.7	24	37.24	2	29.4	13	12.78	1	72.8	1
34.3	54.47	5	31.5	0	22.78	26	58.7	20	37.18	6	30.5	11	12.74	4	72.8	0
Sec δ, Tan δ	1.069		+0.378		1.869		−1.579		1.013		−0.161		1.070		+0.381	
Mean Place	50ˢ.413		7″.95		19ˢ.219		63″.16		33ˢ.466		45″.57		8ˢ.632		49″.49	
D′ψ α, Dω α	+0.01		−0.02		−0.03		+0.07		0.00		+0.01		+0.01		−0.02	
Dψ δ, Dω δ	+0.3		+0.7		+0 3		+0.7		+0.3		+0.7		+0.3		+0.8	

APPARENT PLACES OF STARS, 1912.

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	e Eridani. Mag. 4.3				α Persei. Mag. 1.9				ι Hydri. Mag. 5.5				o Tauri. Mag. 3.8			
	Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination N.	
	h m 3 16 s		° ′ −43 23 ″		h m 3 18 s		° ′ +49 32 ″		h m 3 18 s		° ′ −77 42 ″		h m 3 20 s		° ′ + 8 43 ″	
Jan. 0.4	25.99		88.8		2.35		70.3		13.75		48.4		4.93		16.3	
10.3	25.83	16	90.4	16	2.22	13	71.5	12	12.84	91	49.9	15	4.86	7	15.8	5
20.3	25.63	20	91.6	12	2.05	17	72.2	7	11.85	99	50.8	9	4.77	9	15.3	5
30.3	25.41	22	92.3	7	1.84	21	72.6	4	10.80	105	51.2	4	4.65	12	14.8	5
Feb. 9.3	25.18	23	92.6	3	1.60	24	72.6	0	9.72	108	51.0	2	4.52	13	14.4	4
19.2	24.94	24	92.3	3	1.35	25	72.2	4	8.63	109	50.2	8	4.37	15	14.1	3
29.2	24.69	25	91.5	8	1.10	25	71.5	7	7.57	106	48.8	14	4.22	15	13.8	3
Mar. 10.2	24.46	23	90.2	13	0.87	23	70.5	10	6.57	100	46.9	19	4.08	14	13.6	2
20.1	24.25	21	88.5	17	0.66	21	69.2	13	5.65	92	44.6	23	3.96	12	13.5	1
30.1	24.08	17	86.4	21	0.50	16	67.7	15	4.84	81	41.9	27	3.86	10	13.5	0
Apr. 9.1	23.95	13	84.0	24	0.39	11	66.0	17	4.15	69	38.8	31	3.79	7	13.7	2
19.1	23.87	8	81.2	28	0.34	5	64.3	17	3.61	54	35.5	33	3.76	3	14.0	3
29.0	23.84	3	78.1	31	0.36	2	62.6	17	3.22	39	31.9	36	3.78	2	14.5	5
May 9.0	23.86	2	74.9	32	0.45	9	61.0	16	2.99	23	28.2	37	3.84	6	15.2	7
19.0	23.94	8	71.5	34	0.60	15	59.5	15	2.94	5	24.5	37	3.95	11	16.1	9
29.0	24.08	14	68.1	34	0.82	22	58.2	13	3.06	12	20.9	36	4.10	15	17.2	11
June 7.9	24.27	19	64.7	34	1.10	28	57.2	10	3.35	29	17.4	35	4.30	20	18.4	12
17.9	24.51	24	61.4	33	1.43	33	56.6	6	3.81	46	14.0	34	4.54	24	19.8	14
27.9	24.79	28	58.3	31	1.81	38	56.3	3	4.41	60	10.9	31	4.80	26	21.3	15
July 7.8	25.11	32	55.5	28	2.22	41	56.3	0	5.15	74	8.2	27	5.08	28	22.9	16
17.8	25.46	35	53.0	25	2.65	43	56.6	3	6.00	85	6.0	22	5.38	30	24.5	16
27.8	25.83	37	50.9	21	3.10	45	57.2	6	6.94	94	4.2	18	5.70	32	26.1	16
Aug. 6.8	26.21	38	49.3	16	3.56	46	58.1	9	7.94	100	3.0	12	6.02	32	27.6	15
16.7	26.59	38	48.2	11	4.01	45	59.3	12	8.96	102	2.4	6	6.33	31	29.0	14
26.7	26.96	37	47.7	5	4.45	44	60.7	14	9.98	102	2.4	0	6.64	31	30.3	13
Sept. 5.7	27.32	36	47.8	1	4.87	42	62.4	17	10.97	99	3.1	7	6.93	29	31.4	11
15.7	27.65	33	48.4	6	5.27	40	64.2	18	11.90	93	4.4	13	7.20	27	32.2	
25.6	27.95	30	49.5	11	5.64	37	66.2	20	12.72	82	6.2	18	7.46	26	32.9	
Oct. 5.6	28.21	26	51.1	16	5.98	34	68.3	21	13.41	69	8.5	23	7.69	23	33.4	
15.6	28.44	23	53.2	21	6.28	30	70.5	22	13.96	55	11.2	27	7.89	20	33.6	
25.5	28.63	19	55.6	24	6.54	26	72.7	22	14.34	38	14.2	30	8.07	18	33.7	
Nov. 4.5	28.77	14	58.3	27	6.76	22	74.9	22	14.53	19	17.4	32	8.23	16	33.6	
14.5	28.86	9	61.1	28	6.93	17	77.1	22	14.53	0	20.7	33	8.35	12	33.3	
24.5	28.90	4	63.9	28	7.05	12	79.2	21	14.34	19	23.9	32	8.44	9	33.0	
Dec. 4.4	28.89	1	66.6	27	7.12	7	81.2	20	13.96	38	26.9	30	8.50	6	32.5	
14.4	28.83	6	69.2	26	7.13	1	83.0	18	13.41	55	29.7	28	8.53	3	32.0	
24.4	28.73	10	71.5	23	7.09	4	84.6	16	12.70	71	32.0	23	8.52	1	31.5	
34.4	28.60	13	73.5	20	6.99	10	85.9	13	11.86	84	33.9	19	8.47	5	31.0	
Sec δ, Tan δ	1.376		−0.945		1.541		+1.173		4.697		−4.589		1.012		+0.153	
Mean Place	$24^{s}.766$		$80''.98$		$1^{s}.991$		$55''.57$		$7^{s}.808$		$36''.94$		$4^{s}.537$		$11''.34$	
D′ψ α, Dω α	−0.02		+0.04		+0.02		−0.05		−0.09		+0.20		0.00		−0.01	
Dψ δ, Dω δ	+0.3		+0.8		+0.3		+0.8		+0.3		+0.8		+0.3		+0.8	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	**2 H. Camelop.** Mag. 4.4				**ξ Tauri.** Mag. 3.8				**f Tauri.** Mag. 4.3				**ε Eridani.** Mag. 3.8			
	Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination S.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	3 21		+59 38		3 22		+ 9 25		3 25		+12 38		3 28		− 9 44	
	s		″		s		″		s		″		s		″	
Jan. 0.4	56.60		20.9		24.28		40.2		61.15		14.9		47.60		79.3	
10.3	56.41	19	22.4	15	24.21	7	39.7	5	61.10	5	14.6	3	47.53	7	80.4	11
20.3	56.17	24	23.5	11	24.12	9	39.2	5	61.01	9	14.2	4	47.43	10	81.4	10
30.3	55.88	29	24.2	7	24.01	11	38.8	4	60.89	12	13.8	4	47.30	13	82.1	7
Feb. 9.3	55.55	33	24.4	2	23.88	13	38.4	4	60.75	14	13.4	4	47.16	14	82.6	5
19.2	55.21	34	24.2	2	23.73	15	38.0	4	60.60	15	13.0	4	47.00	16	82.9	3
29.2	54.87	34	23.5	7	23.58	15	37.7	3	60.45	15	12.7	3	46.84	16	82.9	0
Mar. 10.2	54.55	32	22.4	11	23.44	14	37.5	2	60.31	14	12.4	3	46.69	15	82.6	3
20.1	54.27	28	20.9	15	23.31	13	37.4	1	60.18	13	12.2	2	46.55	14	82.1	5
30.1	54.04	23	19.1	18	23.21	10	37.4	0	60.07	11	12.0	2	46.43	12	81.3	8
Apr. 9.1	53.88	16	17.1	20	23.14	7	37.5	1	60.00	7	12.0	0	46.35	8	80.3	10
19.1	53.79	9	15.0	21	23.11	3	37.8	3	59.97	3	12.1	1	46.30	5	79.0	13
29.0	53.79	0	12.9	21	23.13	2	38.2	4	59.98	1	12.4	3	46.30	0	77.4	16
May 9.0	53.87	8	10.9	20	23.19	6	38.9	7	60.04	6	12.9	5	46.34	4	75.7	17
19.0	54.04	17	8.9	20	23.30	11	39.8	9	60.15	11	13.6	7	46.42	8	73.8	19
29.0	54.30	26	7.1	18	23.45	15	40.9	11	60.30	15	14.4	8	46.55	13	71.7	21
June 7.9	54.63	33	5.6	15	23.64	19	42.1	12	60.49	19	15.4	10	46.73	18	69.5	22
17.9	55.03	40	4.5	11	23.87	23	43.4	13	60.72	23	16.6	12	46.94	21	67.3	22
27.9	55.48	45	3.7	8	24.14	27	44.8	14	60.98	26	17.9	13	47.18	24	65.1	22
July 7.8	55.98	50	3.2	5	24.43	29	46.3	15	61.27	29	19.3	14	47.45	27	62.9	22
17.8	56.51	53	3.1	1	24.73	30	47.9	16	61.58	31	20.7	14	47.74	29	60.9	20
27.8	57.06	55	3.4	3	25.04	31	49.5	16	61.90	32	22.2	15	48.04	30	59.0	19
Aug. 6.8	57.62	56	4.1	7	25.35	31	51.0	15	62.22	32	23.6	14	48.34	30	57.3	17
16.7	58.18	56	5.2	11	25.66	31	52.4	14	62.54	32	25.0	14	48.65	31	55.9	14
26.7	58.73	55	6.6	14	25.97	31	53.6	12	62.85	31	26.3	13	48.95	30	54.9	10
Sept. 5.7	59.26	53	8.3	17	26.27	30	54.7	11	63.15	30	27.4	11	49.24	29	54.2	7
15.7	59.76	50	10.2	19	26.55	28	55.6	9	63.43	28	28.4	10	49.51	27	53.8	4
25.6	60.22	46	12.3	21	26.81	26	56.3	7	63.69	26	29.2	8	49.76	25	53.8	0
Oct. 5.6	60.64	42	14.6	23	27.04	23	56.8	5	63.93	24	29.8	6	49.99	23	54.1	3
15.6	61.02	38	17.1	25	27.25	21	57.1	3	64.15	22	30.2	4	50.19	20	54.8	7
25.5	61.35	33	19.7	26	27.43	18	57.2	1	64.34	19	30.5	3	50.37	18	55.8	10
Nov. 4.5	61.62	27	22.4	27	27.59	16	57.1	1	64.50	16	30.6	1	50.52	15	57.0	12
14.5	61.83	21	25.1	27	27.72	13	56.9	2	64.63	13	30.6	0	50.64	12	58.3	13
24.5	61.97	14	27.7	26	27.81	9	56.6	3	64.73	10	30.4	2	50.72	8	59.8	15
Dec. 4.4	62.04	7	30.2	25	27.87	6	56.2	4	64.80	7	30.2	2	50.77	5	61.3	15
14.4	62.04	0	32.5	23	27.90	3	55.7	5	64.83	3	30.0	2	50.79	2	62.8	15
24.4	61.97	7	34.6	21	27.89	1	55.2	5	64.83	0	29.7	3	50.77	2	64.2	14
34.4	61.83	14	36.3	17	27.85	4	54.7	5	64.79	4	29.3	4	50.72	5	65.4	12
Sec δ, Tan δ	1.978		+1.707		1.014		+0.166		1.025		+0.224		1.015		−0.172	
Mean Place	$56^{s}.055$		$4''.42$		$23^{s}.886$		$34''.96$		$60^{s}.759$		$8''.76$		$47^{s}.015$		$79''.74$	
$D'_{\psi}\alpha$, $D_{\omega}\alpha$	+0.03		−0.07		0.00		−0.01		0.00		−0.01		0.00		+0.01	
$D_{\psi}\delta$, $D_{\omega}\delta$	+0.3		+0.8		+0.3		+0.8		+0.2		+0.8		+0.2		+0.8	

Mean Solar Date.	τ^6 Eridani. Mag. 4.3				δ Persei. Mag. 3.1				δ Eridani. Mag. 3.7				ν Persei. Mag. 3.9			
	Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination N.	
	h m 3 29		° ′ −21 55		h m 3 36		° ′ +47 30		h m 3 39		° ′ −10 3		h m 3 39		° ′ +42 18	
	s		″		s		″		s		″		s		″	
Jan. 0.4	54.71	8	41.7	15	39.69	10	39.3	12	2.56	7	38.3	11	13.11	8	18.3	10
10.3	54.63	12	43.2	12	39.59	15	40.5	9	2.49	9	39.4	10	13.03	13	19.3	6
20.3	54.51	15	44.4	8	39.44	18	41.4	5	2.40	12	40.4	8	12.90	16	19.9	4
30.3	54.36	16	45.2	5	39.26	22	41.9	1	2.28	14	41.2	5	12.74	19	20.3	1
Feb. 9.3	54.20	18	45.7	2	39.04	24	42.0	2	2.14	16	41.7	3	12.55	21	20.4	2
19.2	54.02	17	45.9	2	38.80	24	41.8	5	1.98	17	42.0	0	12.34	22	20.2	5
29.2	53.85	17	45.7	6	38.56	23	41.3	9	1.81	16	42.0	3	12.12	21	19.7	8
Mar. 10.2	53.68	16	45.1	9	38.33	21	40.4	11	1.65	14	41.7	5	11.91	19	18.9	10
20.2	53.52	13	44.2	12	38.12	17	39.3	13	1.51	12	41.2	8	11.72	16	17.9	12
30.1	53.39	10	43.0	16	37.95	12	38.0	15	1.39	9	40.4	10	11.56	11	16.7	12
Apr. 9.1	53.29	6	41.4	19	37.83	7	36.5	16	1.30	5	39.4	13	11.45	6	15.5	14
19.1	53.23	1	39.5	21	37.76	1	34.9	16	1.25	1	38.1	15	11.39	1	14.1	13
29.0	53.22	3	37.4	23	37.75	6	33.3	15	1.24	3	36.6	18	11.38	6	12.8	13
May 9.0	53.25	8	35.1	25	37.81	13	31.8	14	1.27	8	34.8	19	11.44	12	11.5	11
19.0	53.33	12	32.6	27	37.94	19	30.4	12	1.35	12	32.9	21	11.56	18	10.4	9
29.0	53.45	17	29.9	27	38.13	25	29.2	10	1.47	16	30.8	22	11.74	23	9.5	7
June 7.9	53.62	21	27.2	27	38.38	30	28.2	7	1.63	21	28.6	22	11.97	28	8.8	5
17.9	53.83	24	24.5	26	38.68	35	27.5	4	1.84	24	26.4	23	12.25	32	8.3	2
27.9	54.07	27	21.9	25	39.03	39	27.1	1	2.08	26	24.1	22	12.57	36	8.1	1
July 7.9	54.34	29	19.4	24	39.42	41	27.0	1	2.34	28	21.9	21	12.93	38	8.2	3
17.8	54.63	31	17.0	20	39.83	43	27.1	5	2.62	30	19.8	19	13.31	40	8.5	6
27.8	54.94	32	15.0	17	40.26	43	27.6	7	2.92	31	17.9	17	13.71	40	9.1	8
Aug. 6.8	55.26	32	13.3	14	40.69	44	28.3	10	3.23	31	16.2	14	14.11	41	9.9	10
16.7	55.58	31	11.9	9	41.13	43	29.3	13	3.54	30	14.8	11	14.52	40	10.9	12
26.7	55.89	30	11.0	5	41.56	42	30.6	14	3.84	29	13.7	7	14.92	39	12.1	14
Sept. 5.7	56.19	28	10.5	0	41.98	40	32.0	16	4.13	28	13.0	4	15.31	37	13.5	15
15.7	56.47	26	10.5	4	42.38	38	33.6	17	4.41	26	12.6	0	15.68	35	15.0	16
25.6	56.73	24	10.9	9	42.76	35	35.3	19	4.67	24	12.6	3	16.03	32	16.6	17
Oct. 5.6	56.97	21	11.8	12	43.11	31	37.2	19	4.91	21	12.9	7	16.35	30	18.3	17
15.6	57.18	17	13.0	16	43.42	28	39.1	20	5.12	19	13.6	10	16.65	26	20.0	18
25.6	57.35	15	14.6	18	43.70	24	41.1	20	5.31	15	14.6	12	16.91	23	21.8	17
Nov. 4.5	57.50	11	16.4	20	43.94	19	43.1	20	5.46	13	15.8	14	17.14	19	23.5	17
14.5	57.61	8	18.4	21	44.13	15	45.1	20	5.59	10	17.2	15	17.33	14	25.2	17
24.5	57.69	4	20.5	21	44.28	10	47.1	19	5.69	6	18.7	15	17.47	9	26.9	15
Dec. 4.4	57.73	0	22.6	20	44.38	4	49.0	17	5.75	3	20.2	15	17.56	5	28.4	14
14.4	57.73	3	24.6	19	44.42	1	50.7	15	5.78	1	21.7	15	17.61	0	29.8	13
24.4	57.70	7	26.5	16	44.41	7	52.2	13	5.77	4	23.2	13	17.61	5	31.1	11
34.4	57.63		28.1		44.34		53.5		5.73		24.5		17.56		32.2	
Sec δ, Tan δ	1.078		−0.403		1.481		+1.092		1.016		−0.177		1.352		+0.910	
Mean Place	$53^{s}.960$		$39''.25$		$39^{s}.206$		$25''.24$		$1^{s}.929$		$39''.01$		$12^{s}.644$		$5''.23$	
$D'_{\psi}\alpha$, $D_{\omega}\alpha$	−0.01		+0.02		+0.02		−0.04		0.00		+0.01		+0.02		−0.04	
$D_{\psi}\delta$, $D_{\omega}\delta$	+0.2		+0.8		+0.2		+0.8		+0.2		+0.8		+0.2		+0.8	

Mean Solar Date.	5 H. Camelop. Mag. 4.7				η Tauri. Mag. 3.0				τ⁶ Eridani. Mag. 4.3				g² Eridani. Mag. 4.2			
	Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination S.	
	h m 3 40		° ′ +71 3		h m 3 42		° ′ +23 50		h m 3 43		° ′ −23 30		h m 3 46		° ′ −36 27	
	s		″		s		″		s		″		s		″	
Jan. 0.4	64.33		61.2		15.47		10.4		4.53		32.7		10.84		62.4	
10.4	64.03	30	63.3	21	15.42	5	10.5	1	4.44	9	34.3	16	10.72	12	64.3	19
20.3	63.63	40	65.0	17	15.33	9	10.6	1	4.33	11	35.6	13	10.56	16	65.8	15
30.3	63.15	48	66.2	12	15.21	12	10.5	1	4.18	15	36.6	10	10.37	19	66.9	11
Feb. 9.3	62.62	53	66.8	6	15.07	14	10.3	2	4.01	17	37.2	6	10.16	21	67.5	6
19.2	62.05	57	66.9	1	14.91	16	10.0	3	3.83	18	37.5	3	9.94	22	67.7	2
29.2	61.47	58	66.5	4	14.74	17	9.6	4	3.65	18	37.4	1	9.72	22	67.4	3
Mar. 10.2	60.92	55	65.6	9	14.58	16	9.1	5	3.47	18	36.9	5	9.49	23	66.6	8
20.2	60.42	50	64.2	14	14.43	15	8.6	5	3.30	17	36.0	9	9.28	21	65.4	12
30.1	60.00	42	62.3	19	14.31	12	8.0	6	3.15	15	34.8	12	9.10	18	63.8	16
Apr. 9.1	59.67	33	60.2	21	14.22	9	7.5	5	3.04	11	33.2	16	8.96	14	61.8	20
19.1	59.46	21	57.8	24	14.17	5	7.1	4	2.97	7	31.4	18	8.85	11	59.4	24
29.1	59.37	9	55.3	25	14.17	0	6.7	4	2.94	3	29.3	21	8.79	6	56.8	26
May 9.0	59.41	4	52.8	25	14.22	5	6.5	2	2.95	1	26.9	24	8.78	1	54.0	28
19.0	59.58	17	50.4	24	14.32	10	6.4	1	3.01	6	24.4	25	8.82	4	51.0	30
29.0	59.88	30	48.1	23	14.47	15	6.6	2	3.12	11	21.7	27	8.92	10	47.8	32
June 7.9	60.29	41	46.0	21	14.67	20	6.9	3	3.28	16	19.0	27	9.07	15	44.6	32
17.9	60.81	52	44.2	18	14.90	23	7.4	5	3.48	20	16.2	28	9.26	19	41.4	32
27.9	61.43	62	42.7	15	15.17	27	8.1	7	3.71	23	13.6	26	9.50	24	38.4	30
July 7.9	62.12	69	41.6	11	15.47	30	8.9	8	3.97	26	11.0	26	9.77	27	35.5	29
17.8	62.88	76	40.9	7	15.78	31	9.9	10	4.26	29	8.6	24	10.07	30	32.9	26
27.8	63.68	80	40.7	2	16.11	33	11.0	11	4.56	30	6.5	21	10.39	32	30.7	22
Aug. 6.8	64.50	82	40.8	1	16.45	34	12.1	11	4.87	31	4.8	17	10.73	34	28.9	18
16.8	65.33	83	41.4	6	16.79	34	13.3	12	5.19	32	3.4	14	11.07	34	27.5	14
26.7	66.16	83	42.4	10	17.13	34	14.6	13	5.50	31	2.4	10	11.41	34	26.6	9
Sept. 5.7	66.97	81	43.8	14	17.45	32	15.8	12	5.81	31	1.9	5	11.74	33	26.3	3
15.7	67.75	78	45.5	17	17.76	31	16.9	11	6.10	29	1.9	0	12.06	32	26.6	3
25.6	68.48	73	47.6	21	18.05	29	18.0	11	6.37	27	2.4	5	12.35	29	27.4	8
Oct. 5.6	69.16	68	50.0	24	18.32	27	19.0	10	6.61	24	3.3	9	12.62	27	28.6	12
15.6	69.77	61	52.6	26	18.56	24	19.9	9	6.83	22	4.6	13	12.86	24	30.3	17
25.6	70.30	53	55.4	28	18.78	22	20.7	8	7.02	19	6.2	16	13.06	20	32.5	22
Nov. 4.5	70.74	44	58.4	30	18.97	19	21.4	7	7.18	16	8.1	19	13.23	17	35.0	25
14.5	71.08	34	61.5	31	19.13	16	22.0	6	7.31	13	10.2	21	13.35	12	37.6	26
24.5	71.31	23	64.6	31	19.26	13	22.5	5	7.40	9	12.4	22	13.43	8	40.4	28
Dec. 4.5	71.43	12	67.6	30	19.35	9	22.9	4	7.45	5	14.7	23	13.46	3	43.1	27
14.4	71.44	1	70.4	28	19.40	5	23.3	4	7.46	1	16.8	21	13.45	1	45.7	26
24.4	71.32	12	73.1	27	19.42	2	23.5	2	7.44	2	18.8	20	13.40	5	48.1	24
34.4	71.09	23	75.4	23	19.39	3	23.7	2	7.37	7	20.6	18	13.30	10	50.2	21
Sec δ, Tan δ	3.082		+2.915		1.093		+0.442		1.090		−0.435		1.243		−0.739	
Mean Place	$63^{s}.045$		43″.80		$15^{s}.035$		1″.34		$3^{s}.692$		30″.63		$9^{s}.698$		57″.97	
$D'_{\psi}\alpha$, $D_{\omega}\alpha$	+0.06		−0.11		+0.01		−0.02		−0.01		+0.02		−0.02		+0.03	
$D_{\psi}\delta$, $D_{\omega}\delta$	+0.2		+0.8		+0.2		+0.8		+0.2		+0.8		+0.2		+0.8	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	γ Hydri. Mag. 3.2				ζ Persei. Mag. 2.9				9 H. Camelop. Mag. 5.2				ε Persei. Mag. 3.0			
	Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination N.	
	h m 3 48		° ′ −74 29		h m 3 48		° ′ +31 37		h m 3 49		° ′ +60 51		h. m 3 51		° ′ +39 45	
	s		″		s		″		s		″		s		″	
Jan. 0.4	40.30		100.4		36.28		33.8		38.34		23.2		57.22		35.7	
10.4	39.65	65	102.4	20	36.23	5	34.3	5	38.18	16	25.0	18	57.16	6	36.6	9
20.3	38.91	74	103.9	15	36.14	9	34.6	3	37.96	22	26.5	15	57.05	11	37.2	6
30.3	38.11	80	104.8	9	36.01	13	34.8	2	37.68	28	27.5	10	56.90	15	37.6	4
Feb. 9.3	37.26	85	105.1	3	35.85	16	34.7	1	37.35	33	28.0	5	56.72	18	37.8	2
19.2	36.39	87	104.8	3	35.68	17	34.5	2	37.00	35	28.1	1	56.52	20	37.7	1
29.2	35.53	86	104.0	8	35.49	19	34.1	4	36.64	36	27.7	4	56.31	21	37.3	4
Mar. 10.2	34.69	84	102.6	14	35.31	18	33.5	6	36.28	36	26.9	8	56.11	20	36.6	7
20.2	33.90	79	100.7	19	35.15	16	32.8	7	35.96	32	25.7	12	55.93	18	35.8	8
30.1	33.18	72	98.4	23	35.01	14	32.1	7	35.69	27	24.1	16	55.77	16	34.8	10
Apr. 9.1	32.55	63	95.7	27	34.91	10	31.3	8	35.48	21	22.3	18	55.65	12	33.7	11
19.1	32.02	53	92.6	31	34.85	6	30.5	8	35.34	14	20.3	20	55.58	7	32.5	12
29.1	31.62	40	89.3	33	34.84	1	29.7	8	35.29	5	18.2	21	55.56	2	31.3	12
May 9.0	31.35	27	85.8	35	34.89	5	29.0	7	35.33	4	16.0	22	55.60	4	30.2	11
19.0	31.22	13	82.1	37	34.99	10	28.5	5	35.45	12	14.0	20	55.70	10	29.2	10
29.0	31.23	1	78.4	37	35.14	15	28.1	4	35.66	21	12.1	19	55.86	16	28.3	9
June 7.9	31.37	14	74.8	36	35.34	20	28.0	1	35.95	29	10.4	17	56.07	21	27.7	6
17.9	31.65	28	71.4	34	35.58	24	28.0	0	36.32	37	8.9	15	56.33	26	27.3	4
27.9	32.06	41	68.1	33	35.86	28	28.2	2	36.75	43	7.8	11	56.63	30	27.1	2
July 7.9	32.58	52	65.1	30	36.17	31	28.7	5	37.24	49	7.0	8	56.97	34	27.2	1
17.8	33.21	63	62.5	26	36.51	34	29.3	6	37.77	53	6.5	5	57.34	37	27.5	3
27.8	33.92	71	60.4	21	36.86	35	30.1	8	38.33	56	6.4	1	57.72	38	28.0	5
Aug. 6.8	34.70	78	58.8	16	37.22	36	31.1	10	38.91	58	6.7	3	58.11	39	28.7	7
16.8	35.52	82	57.8	10	37.58	36	32.2	11	39.49	58	7.3	6	58.50	39	29.6	9
26.7	36.36	84	57.4	4	37.93	35	33.3	11	40.07	58	8.3	10	58.89	39	30.7	11
Sept. 5.7	37.18	82	57.6	2	38.28	35	34.5	12	40.64	57	9.6	13	59.27	38	32.0	13
15.7	37.96	78	58.5	9	38.61	33	35.8	13	41.19	55	11.2	16	59.63	36	33.3	13
25.6	38.69	73	59.9	14	38.93	32	37.0	12	41.70	51	13.0	18	59.98	35	34.7	14
Oct. 5.6	39.33	64	61.9	20	39.22	29	38.3	13	42.18	48	15.0	20	60.31	33	36.2	15
15.6	39.87	54	64.4	25	39.49	27	39.5	12	42.62	44	17.3	23	60.60	29	37.7	15
25.6	40.28	41	67.3	29	39.73	24	40.6	11	43.01	39	19.7	24	60.87	27	39.2	15
Nov. 4.5	40.56	28	70.4	31	39.94	21	41.7	11	43.35	34	22.3	26	61.11	24	40.7	15
14.5	40.69	13	73.7	33	40.12	18	42.8	11	43.62	27	24.9	26	61.31	20	42.2	15
24.5	40.66	3	77.1	34	40.27	15	43.8	10	43.82	20	27.5	26	61.47	16	43.7	15
Dec. 4.5	40.48	18	80.4	33	40.37	10	44.7	9	43.95	13	30.0	25	61.58	11	45.1	14
14.4	40.15	33	83.4	30	40.43	6	45.5	8	44.01	6	32.4	24	61.64	6	46.4	13
24.4	39.69	46	86.1	27	40.45	2	46.2	7	43.98	3	34.6	22	61.66	2	47.5	11
34.4	39.11	58	88.4	23	40.42	3	46.8	6	43.87	11	36.6	20	61.63	3	48.5	10
Sec δ, Tan δ	3.743		−3.607		1.174		+0.616		2.053		+1.793		1.301		+0.832	
Mean Place	35ˢ.343		91″.91		35ˢ.809		22″.99		37ˢ.466		7″.31		56ˢ.690		23″.29	
D′ψ α, Dω α	−0.08		+0.13		+0.01		−0.02		+0.04		−0.06		+0.02		−0.03	
Dψ δ, Dω δ	+0.2		+0.8		+0.2		+0.8		+0.2		+0.8		+0.2		+0.8	

Mean Solar Date.	ξ Persei. Mag. 4.0				γ Eridani. Mag. 3.2				λ Tauri. Var. 3.3-4.2				δ Reticuli. Mag. 4.4			
	Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination S.	
	h m 3 53 s		° ′ +35 32 ″		h m 3 53 s		° ′ −13 45 ″		h m 3 55 s		° ′ +12 14 ″		h m 3 57 s		° ′ −61 38 ″	
Jan. 0.4	15.61		30.7		56.12		29.2		48.72		39.1		23.43		60.4	
10.4	15.56	5	31.4	7	56.06	6	30.6	14	48.68	4	38.7	4	23.13	30	62.6	22
20.3	15.46	10	31.9	5	55.97	9	31.7	11	48.61	7	38.3	4	22.78	35	64.3	17
30.3	15.32	14	32.2	3	55.85	12	32.6	9	48.50	11	38.0	3	22.38	40	65.5	12
Feb. 9.3	15.15	17	32.3	1	55.70	15	33.3	7	48.37	13	37.7	3	21.95	43	66.1	6
19.3	14.97	18	32.1	2	55.54	16	33.6	3	48.22	15	37.4	3	21.50	45	66.1	0
29.2	14.78	19	31.7	4	55.37	17	33.6	0	48.07	15	37.1	3	21.04	46	65.6	5
Mar. 10.2	14.59	19	31.2	5	55.20	17	33.3	3	47.91	16	36.9	2	20.59	45	64.5	11
20.2	14.41	18	30.4	8	55.05	15	32.8	5	47.76	15	36.7	2	20.17	42	62.9	16
30.1	14.26	15	29.5	9	54.92	13	32.0	8	47.64	12	36.6	1	19.79	38	60.9	20
Apr. 9.1	14.15	11	28.6	9	54.81	11	30.9	11	47.55	9	36.6	0	19.45	34	58.4	25
19.1	14.09	6	27.6	10	54.74	7	29.5	14	47.49	6	36.7	1	19.18	27	55.5	29
29.1	14.07	2	26.6	10	54.71	3	27.9	16	47.48	1	37.0	3	18.98	20	52.4	31
May 9.0	14.11	4	25.7	9	54.73	2	26.0	19	47.51	3	37.4	4	18.86	12	49.0	34
19.0	14.21	10	24.9	8	54.79	6	24.0	20	47.59	8	38.0	6	18.81	5	45.4	36
29.0	14.36	15	24.3	6	54.89	10	21.8	22	47.71	12	38.8	8	18.85	4	41.8	36
June 7.9	14.56	20	23.9	4	55.04	15	19.5	23	47.88	17	39.7	9	18.97	12	38.1	37
17.9	14.81	25	23.7	2	55.23	19	17.2	23	48.09	21	40.8	11	19.17	20	34.6	35
27.9	15.10	29	23.8	1	55.45	22	14.8	24	48.33	24	42.0	12	19.44	27	31.2	34
July 7.9	15.42	32	24.0	2	55.71	26	12.5	23	48.60	27	43.3	13	19.78	34	28.1	31
17.8	15.76	34	24.4	4	55.99	28	10.4	21	48.89	29	44.6	13	20.18	40	25.3	28
27.8	16.12	36	25.1	7	56.28	29	8.4	20	49.20	31	45.9	13	20.62	44	23.0	23
Aug. 6.8	16.49	37	25.9	8	56.58	30	6.7	17	49.51	31	47.2	13	21.10	48	21.2	18
16.8	16.87	38	26.9	10	56.89	31	5.3	14	49.83	32	48.5	13	21.60	50	20.0	12
26.7	17.24	37	28.0	11	57.19	30	4.2	11	50.14	31	49.6	11	22.11	51	19.3	7
Sept. 5.7	17.61	37	29.2	12	57.49	30	3.5	7	50.45	31	50.6	10	22.61	50	19.2	1
15.7	17.96	35	30.4	12	57.77	28	3.2	3	50.74	29	51.5	9	23.09	48	19.8	6
25.6	18.29	33	31.7	13	58.04	27	3.3	1	51.02	28	52.1	6	23.54	45	21.0	12
Oct. 5.6	18.60	31	33.1	14	58.29	25	3.8	5	51.28	26	52.6	5	23.95	41	22.8	18
15.6	18.88	28	34.4	13	58.52	23	4.7	9	51.52	24	52.9	3	24.30	35	25.1	23
25.6	19.14	26	35.7	13	58.72	20	5.9	12	51.74	22	53.0	1	24.59	29	27.8	27
Nov. 4.5	19.36	22	37.0	13	58.89	17	7.3	14	51.93	19	53.0	0	24.80	21	30.9	31
14.5	19.55	19	38.3	13	59.03	14	8.9	16	52.09	16	52.8	2	24.93	13	34.1	32
24.5	19.71	16	39.5	12	59.14	11	10.7	18	52.22	13	52.6	2	24.99	6	37.4	33
Dec. 4.5	19.82	11	40.6	11	59.21	7	12.5	18	52.32	10	52.3	3	24.97	2	40.7	33
14.4	19.89	7	41.6	10	59.25	4	14.2	17	52.38	6	51.9	4	24.86	11	43.9	32
24.4	19.91	2	42.6	10	59.25	0	15.9	17	52.40	2	51.5	4	24.68	18	46.7	28
34.4	19.88	3	43.4	8	59.21	4	17.4	15	52.39	1	51.1	4	24.42	26	49.2	25
Sec δ, Tan δ	1.229		+0.715		1.030		−0.245		1.023		+0.217		2.106		−1.853	
Mean Place	15ˢ.096		19″.16		55ˢ.397		29″.73		48ˢ.195		32″.60		20ˢ.864		53″.46	
D′ψ α, Dω α	+0.02		−0.03		−0.01		+0.01		0.00		−0.01		−0.04		+0.06	
Dψ δ, Dω δ	+0.2		+0.9		+0.2		+0.9		+0.2		+0.9		+0.2		+0.9	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	*ν* Tauri. Mag. 3.9				A Tauri. Mag. 4.5				*c* Persei. Mag. 4.0				*b* Tauri. Mag. 5.6			
	Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination N.	
	h m 3 58 s		° ′ + 5 44 ″		h m 3 59 s		° ′ +21 50 ″		h m 4 2 s		° ′ +47 28 ″		h m 4 5 s		° ′ +26 15 ″	
Jan. 0.4	29.00	4	50.0	7	29.95	4	40.7	0	16.79	7	55.9	13	28.69	4	16.9	3
10.4	28.96	7	49.3	6	29.91	8	40.7	0	16.72	13	57.2	11	28.65	8	17.2	2
20.3	28.89	10	48.7	5	29.83	11	40.7	0	16.59	17	58.3	7	28.57	11	17.4	0
30.3	28.79	13	48.2	4	29.72	13	40.7	2	16.42	21	59.0	4	28.46	14	17.4	0
Feb. 9.3	28.66	15	47.8	4	29.59	16	40.5	3	16.21	23	59.4	0	28.32	16	17.4	2
19.3	28.51	16	47.4	2	29.43	17	40.2	3	15.98	24	59.4	3	28.16	18	17.2	3
29.2	28.35	15	47.2	1	29.26	17	39.9	4	15.74	24	59.1	6	27.98	17	16.9	4
Mar. 10.2	28.20	14	47.1	0	29.09	15	39.5	4	15.50	23	58.5	9	27.81	16	16.5	5
20.2	28.06	13	47.1	1	28.94	13	39.1	4	15.27	19	57.6	11	27.65	14	16.0	5
30.1	27.93	10	47.2	3	28.81	10	38.7	4	15.08	15	56.5	14	27.51	11	15.5	5
Apr. 9.1	27.83	6	47.5	5	28.71	6	38.3	3	14.93	10	55.1	14	27.40	7	15.0	6
19.1	27.77	2	48.0	6	28.65	1	38.0	2	14.83	4	53.7	15	27.33	2	14.4	5
29.1	27.75	3	48.6	8	28.64	3	37.8	1	14.79	3	52.2	15	27.31	3	13.9	3
May 9.0	27.78	7	49.4	10	28.67	8	37.7	0	14.82	9	50.7	15	27.34	7	13.6	3
19.0	27.85	12	50.4	11	28.75	13	37.7	2	14.91	16	49.2	13	27.41	13	13.3	1
29.0	27.97	16	51.5	13	28.88	18	37.9	3	15.07	22	47.9	11	27.54	18	13.2	1
June 8.0	28.13	20	52.8	14	29.06	22	38.2	5	15.29	28	46.8	9	27.72	22	13.3	3
17.9	28.33	23	54.2	15	29.28	25	38.7	7	15.57	32	45.9	6	27.94	25	13.6	4
27.9	28.56	26	55.7	15	29.53	28	39.4	8	15.89	36	45.3	4	28.19	29	14.0	6
July 7.9	28.82	28	57.2	16	29.81	30	40.2	10	16.25	40	44.9	1	28.48	31	14.6	7
17.8	29.10	30	58.8	15	30.11	32	41.2	10	16.65	42	44.8	2	28.79	33	15.3	8
27.8	29.40	31	60.3	14	30.43	33	42.2	11	17.07	43	45.0	4	29.12	34	16.1	9
Aug. 6.8	29.71	31	61.7	13	30.76	34	43.3	11	17.50	44	45.4	7	29.46	34	17.0	10
16.8	30.02	31	63.0	11	31.10	33	44.4	11	17.94	44	46.1	9	29.80	34	18.0	11
26.7	30.33	30	64.1	9	31.43	32	45.5	11	18.38	43	47.0	11	30.14	34	19.1	10
Sept. 5.7	30.63	29	65.0	7	31.75	31	46.6	10	18.81	41	48.1	13	30.48	32	20.1	10
15.7	30.92	27	65.7	5	32.06	30	47.6	9	19.22	40	49.4	15	30.80	31	21.1	10
25.7	31.19	25	66.2	2	32.36	28	48.5	8	19.62	37	50.9	16	31.11	29	22.1	9
Oct. 5.6	31.44	24	66.4	0	32.64	26	49.3	7	19.99	35	52.5	17	31.40	27	23.0	9
15.6	31.68	21	66.4	2	32.90	23	50.0	6	20.34	31	54.2	18	31.67	25	23.9	8
25.6	31.89	19	66.2	4	33.13	20	50.6	5	20.65	28	56.0	18	31.92	22	24.7	7
Nov. 4.5	32.08	16	65.8	6	33.33	18	51.1	4	20.93	23	57.8	19	32.14	19	25.4	6
14.5	32.24	13	65.2	6	33.51	14	51.5	3	21.16	19	59.7	19	32.33	15	26.0	6
24.5	32.37	9	64.6	7	33.65	11	51.8	3	21.35	13	61.6	18	32.48	12	26.6	
Dec. 4.5	32.46	6	63.9	8	33.76	7	52.1	2	21.48	8	63.4	17	32.60	8	27.1	
14.4	32.52	2	63.1	7	33.83	3	52.3	2	21.56	3	65.1	16	32.68	3	27.6	
24.4	32.54	2	62.4	7	33.86	1	52.5	0	21.59	4	66.7	14	32.71	0	28.0	
34.4	32.52		61.7		33.85		52.5		21.55		68.1		32.71		28.4	
Sec δ, Tan δ	1.005		+0.101		1.077		+0.401		1.480		+1.091		1.115		+0.493	
Mean Place	28ˢ.433		44″.90		29ˢ.423		32″.00		16ˢ.110		42″.36		28ˢ.132		7″.32	
D′ψ α, Dω α	0.00		0.00		+0.01		−0.01		+0.03		−0.04		+0.01		−0.02	
Dψ δ, Dω δ	+0.2		+0.9		+0.2		+0.9		+0.2		+0.9		+0.2		+0.9	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	**o^1 Eridani.** Mag. 4.1				**μ Tauri.** Mag. 4.3				**α Horologii.** Mag. 3.8				**α Reticuli.** Mag. 3.4			
	Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination S.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	4 7		− 7 3		4 10		+ 8 40		4 11		−42 30		4 13		−62 41	
	s		″		s		″		s		″		s		″	
Jan. 0.4	34.85		56.3		45.87		27.5		6.56		44.0		20.00		43.8	
10.4	34.81	4	57.5	12	45.84	3	27.0	5	6.43	13	46.2	22	19.71	29	46.2	24
20.3	34.73	8	58.5	10	45.78	6	26.5	5	6.26	17	48.0	18	19.36	35	48.1	19
30.3	34.62	11	59.4	9	45.68	10	26.0	5	6.05	21	49.4	14	18.95	41	49.5	14
Feb. 9.3	34.48	14	60.0	6	45.55	13	25.6	4	5.81	24	50.3	9	18.50	45	50.3	8
19.3	34.33	15	60.4	4	45.40	15	25.3	3	5.56	25	50.7	4	18.03	47	50.6	3
29.2	34.17	16	60.6	2	45.24	16	25.1	2	5.30	26	50.6	1	17.55	48	50.3	3
Mar. 10.2	34.01	16	60.5	1	45.09	15	24.9	2	5.04	26	50.0	6	17.07	48	49.4	9
20.2	33.86	15	60.2	3	44.95	14	24.8	1	4.79	25	48.9	11	16.61	46	48.0	14
30.2	33.73	13	59.6	6	44.81	14	24.9	1	4.56	23	47.4	15	16.19	42	46.2	18
Apr. 9.1	33.62	11	58.8	8	44.70	11	25.1	2	4.36	20	45.4	20	15.82	37	43.8	24
19.1	33.54	8	57.8	10	44.63	7	25.4	3	4.21	15	43.1	23	15.51	31	41.1	27
29.1	33.50	4	56.6	12	44.60	3	25.8	4	4.10	11	40.5	26	15.27	24	38.1	30
May 9.0	33.51	1	55.1	15	44.62	2	26.4	6	4.05	5	37.6	29	15.10	17	34.8	33
19.0	33.56	5	53.4	17	44.68	6	27.2	8	4.05	0	34.5	31	15.01	9	31.4	34
29.0	33.66	10	51.5	19	44.79	11	28.1	9	4.11	6	31.2	33	15.01	0	27.8	36
June 8.0	33.80	14	49.6	19	44.94	15	29.2	11	4.22	11	27.9	33	15.10	9	24.1	37
17.9	33.98	18	47.6	20	45.13	19	30.4	12	4.39	17	24.6	33	15.27	17	20.5	36
27.9	34.20	22	45.6	20	45.36	23	31.7	13	4.60	21	21.4	32	15.52	25	17.1	34
July 7.9	34.44	24	43.5	21	45.61	25	33.0	13	4.86	26	18.3	31	15.84	32	13.9	32
17.9	34.71	27	41.5	20	45.89	28	34.4	14	5.15	29	15.6	27	16.22	38	11.0	29
27.8	35.00	29	39.7	18	46.19	30	35.8	14	5.47	32	13.2	24	16.66	44	8.6	24
Aug. 6.8	35.30	30	38.0	17	46.50	31	37.2	14	5.82	35	11.2	20	17.13	47	6.6	20
16.8	35.60	30	36.6	14	46.81	31	38.4	12	6.18	36	9.7	15	17.63	50	5.2	14
26.7	35.90	30	35.5	11	47.12	31	39.5	11	6.54	36	8.7	10	18.15	52	4.4	8
Sept. 5.7	36.20	30	34.7	8	47.42	30	40.4	9	6.89	35	8.3	4	18.67	52	4.2	2
15.7	36.49	29	34.3	4	47.72	30	41.1	7	7.23	34	8.5	2	19.18	51	4.6	4
25.7	36.76	27	34.2	1	48.00	28	41.6	5	7.56	33	9.2	7	19.65	47	5.6	10
Oct. 5.6	37.02	26	34.5	3	48.26	26	41.9	3	7.86	30	10.5	13	20.09	44	7.3	17
15.6	37.26	24	35.1	6	48.51	25	41.9	0	8.13	27	12.3	18	20.48	39	9.5	22
25.6	37.47	21	36.0	9	48.74	23	41.8	1	8.37	24	14.6	23	20.80	32	12.1	26
Nov. 4.6	37.65	18	37.1	11	48.94	20	41.5	3	8.57	20	17.2	26	21.05	25	15.1	30
14.5	37.81	16	38.4	13	49.11	17	41.1	4	8.72	15	20.0	28	21.22	17	18.3	32
24.5	37.94	13	39.8	14	49.25	14	40.6	5	8.83	11	23.0	30	21.30	8	21.7	34
Dec. 4.5	38.03	9	41.3	15	49.36	11	40.0	6	8.88	5	26.0	30	21.30	0	25.1	34
14.4	38.08	5	42.8	15	49.43	7	39.4	6	8.88	0	29.0	30	21.21	9	28.3	32
24.4	38.10	2	44.2	14	49.47	4	38.8	6	8.84	4	31.7	27	21.04	17	31.3	30
34.4	38.08	2	45.5	13	49.47	0	38.2	6	8.74	10	34.2	25	20.80	24	34.0	27
Sec δ, Tan δ	1.008		−0.124		1.012		+0.154		1.356		−0.917		2.180		−1.937	
Mean Place	34ˢ.152		58″.86		45ˢ.266		21″.58		5ˢ.135		40″.38		17ˢ.247		38″.21	
D′ψ α, Dω α	0.00		0.00		0.00		0.00		−0.02		+0.03		−0.05		+0.06	
Dψ δ, Dω δ	+0.2		+0.9		+0.2		+0.9		+0.2		+0.9		+0.2		+0.9	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	γ Tauri. Mag. 3.9				δ Tauri. Mag. 3.9				υ^6 Eridani. Mag. 4.1				ε Tauri. Mag. 3.6			
	Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination N.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	4 14		+15 24		4 17		+17 20		4 20		−34 12		4 23		+18 59	
	s		″		s		″		s		″		s		″	
Jan. 0.4	47.62		64.5		52.08		20.5		45.06		76.6		29.21		17.8	
10.4	47.59	3	64.2	3	52.06	2	20.4	1	44.98	8	78.7	21	29.19	2	17.8	0
20.3	47.53	6	64.0	2	52.00	6	20.2	2	44.85	13	80.5	18	29.13	6	17.7	1
30.3	47.44	9	63.8	2	51.90	10	20.0	2	44.69	16	81.9	14	29.04	9	17.6	1
Feb. 9.3	47.31	13	63.5	3	51.77	13	19.8	2	44.50	19	82.9	10	28.91	13	17.4	2
19.3	47.16	15	63.2	3	51.62	15	19.6	2	44.28	22	83.4	5	28.76	15	17.2	2
29.2	47.00	16	63.0	2	51.46	16	19.4	2	44.05	23	83.5	1	28.60	16	17.0	2
Mar. 10.2	46.83	17	62.8	2	51.30	16	19.1	3	43.83	22	83.1	4	28.43	17	16.8	2
20.2	46.68	15	62.6	2	51.14	16	18.8	3	43.61	22	82.2	9	28.27	16	16.5	3
30.2	46.55	13	62.4	2	51.00	14	18.6	2	43.41	20	80.9	13	28.13	14	16.2	3
Apr. 9.1	46.44	11	62.3	1	50.89	11	18.5	1	43.24	17	79.3	16	28.02	11	16.0	2
19.1	46.37	7	62.3	0	50.82	7	18.4	1	43.11	13	77.3	20	27.94	8	15.8	2
29.1	46.34	3	62.4	1	50.79	3	18.3	1	43.02	9	75.0	23	27.90	4	15.7	1
May 9.0	46.35	1	62.6	2	50.80	1	18.4	1	42.97	5	72.4	26	27.91	1	15.8	1
19.0	46.41	6	63.0	4	50.86	6	18.7	3	42.98	1	69.6	28	27.97	6	15.9	1
29.0	46.52	11	63.5	5	50.97	11	19.1	4	43.04	6	66.6	30	28.07	10	16.2	3
June 8.0	46.68	16	64.2	7	51.12	15	19.6	5	43.15	11	63.5	31	28.22	15	16.6	4
17.9	46.87	19	65.0	8	51.31	19	20.3	7	43.30	15	60.4	31	28.41	19	17.2	6
27.9	47.10	23	65.9	9	51.54	23	21.2	9	43.50	20	57.4	30	28.64	23	17.9	7
July 7.9	47.36	26	67.0	11	51.80	26	22.2	10	43.74	24	54.5	29	28.90	26	18.8	9
17.9	47.65	29	68.1	11	52.09	29	23.2	10	44.02	28	51.8	27	29.18	28	19.7	9
27.8	47.95	30	69.2	11	52.40	31	24.2	10	44.32	30	49.4	24	29.48	30	20.6	9
Aug. 6.8	48.27	32	70.4	12	52.72	32	25.3	11	44.63	31	47.4	20	29.80	32	21.6	10
16.8	48.59	32	71.5	11	53.04	32	26.3	10	44.95	32	45.9	15	30.13	33	22.6	10
26.7	48.91	32	72.5	10	53.36	32	27.3	10	45.28	33	44.8	11	30.46	33	23.5	9
Sept. 5.7	49.22	31	73.4	9	53.68	32	28.2	9	45.61	33	44.2	6	30.78	32	24.4	9
15.7	49.53	31	74.2	8	53.99	31	29.0	8	45.93	32	44.1	1	31.09	31	25.2	8
25.7	49.82	29	74.9	7	54.29	30	29.7	7	46.24	31	44.6	5	31.39	30	25.9	7
Oct. 5.6	50.10	28	75.4	5	54.57	28	30.3	6	46.53	29	45.6	10	31.68	29	26.5	6
15.6	50.36	26	75.7	3	54.83	26	30.7	4	46.79	26	47.2	16	31.95	27	27.0	5
25.6	50.59	23	75.9	2	55.07	24	31.0	3	47.02	23	49.2	20	32.20	25	27.3	3
Nov. 4.6	50.80	21	76.0	1	55.29	22	31.1	1	47.22	20	51.5	23	32.43	23	27.5	2
14.5	50.99	19	75.9	1	55.48	19	31.2	1	47.39	17	54.1	26	32.63	20	27.6	1
24.5	51.14	15	75.8	1	55.64	16	31.2	0	47.51	12	56.8	27	32.79	16	27.7	1
Dec. 4.5	51.26	12	75.7	1	55.77	13	31.1	1	47.59	8	59.6	28	32.92	13	27.7	0
14.4	51.34	8	75.5	2	55.85	8	31.0	1	47.62	3	62.3	27	33.01	9	27.7	0
24.4	51.38	4	75.2	3	55.89	4	30.9	1	47.61	1	64.9	26	33.07	6	27.7	0
34.4	51.38	0	75.0	2	55.90	1	30.7	2	47.55	6	67.3	24	33.08	1	27.6	1
Sec δ, Tan δ	1.037		+0.276		1.048		+0.312		1.209		−0.680		1.058		+0.344	
Mean Place	$47^{\mathrm{s}}.020$		57″.09		$51^{\mathrm{s}}.471$		12″.71		$43^{\mathrm{s}}.874$		74″.82		$28^{\mathrm{s}}.583$		9″.68	
$D'_{\psi}\alpha$, $D_{\omega}\alpha$	+0.01		−0.01		+0.01		−0.01		−0.02		+0.02		+0.01		−0.01	
$D_{\psi}\delta$, $D_{\omega}\delta$	+0.2		+0.9		+0.2		+0.9		+0.2		+0.9		+0.2		+0.9	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	δ Mensæ. Mag. 5.6				m Persei. Mag. 6.1				α Tauri. Mag. 1.1				ν Eridani. Mag. 4.1			
	Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination S.	
	h m 4 23		° ′ −80 24		h m 4 27		° ′ +42 52		h m 4 30		° ′ +16 19		h m 4 31		° ′ − 3 31	
	s		″		s		″		s		″		s		″	
Jan. 0.4	62.45		80.3		13.96		48.8		52.82		66.9		56.00		50.0	
10.4	61.46	99	82.7	24	13.92	4	50.0	12	52.80	2	66.8	1	55.99	1	51.1	11
20.4	60.29	117	84.6	19	13.83	9	51.0	10	52.75	5	66.6	2	55.93	6	52.1	10
30.3	58.98	131	85.9	13	13.70	13	51.7	7	52.66	9	66.4	2	55.83	10	52.9	8
Feb. 9.3	57.58	140	86.7	8	13.53	17	52.2	5	52.54	12	66.2	2	55.70	13	53.5	6
19.3	56.12	146	86.9	2	13.33	20	52.4	2	52.40	14	66.0	2	55.55	15	54.0	5
29.2	54.63	149	86.6	3	13.11	22	52.3	1	52.24	16	65.8	2	55.39	16	54.3	3
Mar. 10.2	53.16	147	85.8	8	12.88	23	51.9	4	52.07	17	65.5	3	55.22	17	54.3	0
20.2	51.74	142	84.4	14	12.67	21	51.3	6	51.91	16	65.3	2	55.06	16	54.2	1
30.2	50.41	133	82.5	19	12.48	19	50.5	8	51.77	14	65.2	1	54.92	14	53.8	4
Apr. 9.1	49.20	121	80.2	23	12.32	16	49.5	10	51.65	12	65.1	1	54.80	12	53.2	6
19.1	48.14	106	77.6	26	12.21	11	48.3	12	51.56	9	65.0	1	54.71	9	52.4	8
29.1	47.25	89	74.6	30	12.15	6	47.0	13	51.52	4	65.0	0	54.66	5	51.4	10
May 9.1	46.55	70	71.3	33	12.15	0	45.8	12	51.52	0	65.2	2	54.65	1	50.2	12
19.0	46.06	49	67.9	34	12.21	6	44.6	12	51.57	5	65.5	3	54.68	3	48.8	14
29.0	45.79	27	64.4	35	12.33	12	43.5	11	51.66	9	65.9	4	54.76	8	47.2	16
June 8.0	45.74	5	60.9	35	12.51	18	42.5	10	51.80	14	66.5	6	54.88	12	45.5	17
17.9	45.92	18	57.4	35	12.74	23	41.7	8	51.98	18	67.2	7	55.04	16	43.7	18
27.9	46.31	39	54.1	33	13.02	28	41.1	6	52.20	22	68.0	8	55.24	20	41.9	18
July 7.9	46.91	60	51.0	31	13.34	32	40.7	4	52.45	25	68.9	9	55.47	23	40.0	19
17.9	47.70	79	48.2	28	13.69	35	40.5	2	52.73	28	69.9	10	55.73	26	38.2	18
27.8	48.66	96	45.8	24	14.07	38	40.6	1	53.03	30	70.9	10	56.01	28	36.5	17
Aug. 6.8	49.75	109	43.9	19	14.47	40	40.9	3	53.34	31	71.9	10	56.30	29	35.0	15
16.8	50.94	119	42.6	13	14.87	40	41.4	5	53.65	31	72.9	10	56.59	29	33.7	13
26.8	52.20	126	41.8	8	15.28	41	42.1	7	53.97	32	73.8	9	56.89	30	32.6	11
Sept. 5.7	53.49	129	41.6	2	15.68	40	42.9	8	54.29	32	74.6	8	57.19	30	31.8	8
15.7	54.76	127	42.1	5	16.08	40	43.9	10	54.60	31	75.3	7	57.48	29	31.3	5
25.7	55.96	120	43.2	11	16.47	39	45.0	11	54.90	30	75.9	6	57.77	29	31.1	2
Oct. 5.6	57.06	110	44.9	17	16.84	37	46.2	12	55.19	29	76.4	5	58.04	27	31.2	1
15.6	58.02	96	47.1	22	17.19	35	47.5	13	55.46	27	76.7	3	58.29	25	31.7	5
25.6	58.79	77	49.7	26	17.51	32	48.9	14	55.71	25	76.8	1	58.52	23	32.5	8
Nov. 4.6	59.35	56	52.7	30	17.80	29	50.3	14	55.94	23	76.9	1	58.73	21	33.5	10
14.5	59.68	33	55.9	32	18.05	25	51.8	15	56.14	20	76.8	1	58.91	18	34.6	11
24.5	59.77	9	59.3	34	18.26	21	53.3	15	56.31	17	76.7	1	59.06	15	35.9	13
Dec. 4.5	59.60	17	62.6	33	18.42	16	54.8	15	56.45	14	76.5	2	59.18	12	37.3	14
14.5	59.18	42	65.8	32	18.53	11	56.2	14	56.55	10	76.3	2	59.26	8	38.7	14
24.4	58.52	66	68.7	29	18.59	6	57.6	14	56.61	6	76.1	2	59.31	5	40.0	13
34.4	57.64	88	71.3	26	18.60	1	58.8	12	56.62	1	75.9	2	59.32	1	41.3	13
Sec δ, Tan δ	6.008		−5.924		1.364		+0.929		1.042		+0.294		1.002		−0.062	
Mean Place	53ˢ.726		75″.04		13ˢ.181		36″.57		52ˢ.159		59″.31		55ˢ.253		53″.95	
D′ψ α, Dω α	−0.14		+0.15		+0.02		−0.02		+0.01		−0.01		0.00		0.00	
Dψ δ, Dω δ	+0.2		+0.9		+0.2		+0.9		+0.2		+0.9		+0.1		+0.9	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	α Doradus. Mag. 3.5				58 Eridani. Mag. 4.0				τ Tauri. Mag. 4.3				Groombridge 848. Mag. 6.0			
	Right Ascension.		Declination S.		Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination N.	
	h m 4 32 s		° ′ −55 13 ″		h m 4 34 s		° ′ −14 28 ″		h m 4 36 s		° +22 47 ″		h m 4 36 s		° ′ +75 46 ″	
Jan. 0.4	7.78		39.6		9.78		29.1		58.38		28.7		61.22		73.0	
10.4	7.59	19	42.2	26	9.75	3	30.7	16	58.37	1	28.9	2	60.98	24	75.6	26
20.4	7.35	24	44.3	21	9.68	7	32.1	14	58.32	5	29.0	1	60.58	40	78.0	24
30.3	7.06	29	46.0	17	9.57	11	33.2	11	58.23	9	29.0	0	60.05	53	79.9	19
Feb. 9.3	6.73	33	47.2	12	9.43	14	34.1	9	58.11	12	29.0	0	59.40	65	81.3	14
19.3	6.37	36	47.8	6	9.27	16	34.7	6	57.96	15	29.0	0	58.67	73	82.2	9
29.3	6.00	37	47.8	0	9.10	17	35.0	3	57.79	17	28.8	2	57.89	78	82.5	3
Mar. 10.2	5.62	38	47.3	5	8.92	18	35.0	0	57.62	17	28.6	2	57.11	78	82.3	2
20.2	5.25	37	46.3	10	8.75	17	34.6	4	57.45	17	28.3	3	56.35	76	81.5	8
30.2	4.91	34	44.8	15	8.59	16	33.9	7	57.30	15	28.0	3	55.66	69	80.3	12
Apr. 9.1	4.61	30	42.8	20	8.46	13	32.9	10	57.17	13	27.7	3	55.07	59	78.6	17
19.1	4.35	26	40.4	24	8.36	10	31.7	12	57.08	9	27.4	3	54.60	47	76.5	21
29.1	4 15	20	37.6	28	8.29	7	30.2	15	57.03	5	27.1	3	54.27	33	74.1	24
May 9.1	4.01	14	34.5	31	8.26	3	28.5	17	57.03	0	26.9	2	54.10	17	71.5	26
19.0	3.94	7	31.2	33	8.28	2	26.6	19	57.08	5	26.8	1	54.10	0	68.9	26
29.0	3.94	0	27.8	34	8.35	7	24.5	21	57.17	9	26.8	0	54.27	17	66.3	26
June 8.0	4.00	6	24.3	35	8.46	11	22.2	23	57.31	14	27.0	2	54.60	33	63.7	26
18.0	4.13	13	20.8	35	8.61	15	19.9	23	57.50	19	27.3	3	55.09	49	61.3	24
27.9	4.33	20	17.4	34	8.80	19	17.6	23	57.72	22	27.7	4	55.72	63	59.2	21
July 7.9	4.59	26	14.2	32	9.02	22	15.3	23	57.97	25	28.3	6	56.47	75	57.3	19
17.9	4.90	31	11.2	30	9.27	25	13.1	22	58.25	28	29.0	7	57.33	86	55.8	15
27.8	5.25	35	8.6	26	9.54	27	11.1	20	58.56	31	29.7	7	58.28	95	54.7	11
Aug. 6.8	5.64	39	6.4	22	9.83	29	9.3	18	58.88	32	30.5	8	59.30	102	53.9	8
16.8	6.05	41	4.7	17	10.13	30	7.8	15	59.21	33	31.3	8	60.37	107	53.5	4
26.8	6.48	43	3.6	11	10.44	31	6.7	11	59.54	33	32.1	8	61.46	109	53.6	1
Sept. 5.7	6.92	44	3.1	5	10.74	30	6.0	7	59.87	33	32.9	8	62.56	110	54.1	5
15.7	7.35	43	3.2	1	11.03	29	5.6	4	60.20	33	33.6	7	63.65	109	55.0	9
25.7	7.76	41	4.0	8	11.32	29	5.6	0	60.52	32	34.3	7	64.72	107	56.3	13
Oct. 5.7	8.14	38	5.4	14	11.59	27	6.1	5	60.82	30	34.9	6	65.74	102	57.9	16
15.6	8.49	35	7.3	19	11.84	25	7.0	9	61.11	29	35.4	5	66.69	95	59.9	20
25.6	8.79	30	9.8	25	12.07	23	8.2	12	61.38	27	35.8	4	67.56	87	62.2	23
Nov. 4.6	9.04	25	12.6	28	12.28	21	9.7	15	61.62	24	36.2	4	68.32	76	64.8	26
14.5	9.23	19	15.7	31	12.46	18	11.5	18	61.83	21	36.5	3	68.97	65	67.6	28
24.5	9.36	13	19.0	33	12.61	15	13.4	19	62.01	18	36.7	2	69.49	52	70.6	30
Dec. 4.5	9.42	6	22.3	33	12.72	11	15.3	19	62.16	15	36.9	2	69.85	36	73.7	31
14.5	9.41	1	25.6	33	12.80	8	17.3	20	62.27	11	37.1	2	70.05	20	76.8	31
24.4	9.33	8	28.7	31	12.83	3	19.2	19	62.34	7	37.3	2	70.09	4	79.7	29
34.4	9.18	15	31.6	29	12.82	1	20.9	17	62.36	2	37.5	2	69.95	14	82.5	28
Sec δ, Tan δ	1.753		−1.440		1.033		−0.258		1.085		+0.420		4.072		+3.948	
Mean Place	5ˢ.636		36″.30		8ˢ.919		31″.27		57ˢ.699		19″.97		58ˢ.270		57″.50	
D′ψ a, Dω a	−0.03		+0.03		−0.01		+0.01		+0.01		−0.01		+0.10		−0.09	
Dψ δ, Dω δ	+0.1		+0.9		+0.1		+0.9		+0.1		+0.9		+0.1		+0.9	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	α Coeli. Mag. 4.5				4 Camelop. Mag. 5.4				μ Eridani. Mag. 4.2				π³ Orionis. Mag. 3.3			
	Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination N.	
	h m 4 37 s		° ′ −42 1 ″		h m 4 40 s		° ′ +56 36 ″		h m 4 41 s		° ′ − 3 24 ″		h m 4 45 s		° ′ + 6 48 ″	
Jan. 0.4	44.95	10	55.5	24	41.26	4	20.7	19	6.87	2	50.6	11	4.43	0	36.6	7
10.4	44.85	15	57.9	21	41.22	12	22.6	17	6.85	5	51.7	10	4.43	4	35.9	6
20.4	44.70	19	60.0	17	41.10	19	24.3	13	6.80	9	52.7	9	4.39	8	35.3	6
30.3	44.51	22	61.7	12	40.91	24	25.6	10	6.71	12	53.6	7	4.31	12	34.7	5
Feb. 9.3	44.29	25	62.9	7	40.67	28	26.6	6	6.59	15	54.3	5	4.19	14	34.2	3
19.3	44.04	26	63.6	2	40.39	31	27.2	1	6.44	16	54.8	2	4.05	15	33.9	2
29.3	43.78	27	63.8	3	40.08	32	27.3	2	6.28	17	55.0	1	3.90	17	33.7	1
Mar. 10.2	43.51	27	63.5	8	39.76	31	27.1	6	6.11	16	55.1	1	3.73	16	33.6	0
20.2	43.24	25	62.7	12	39.45	28	26.5	10	5.95	15	55.0	4	3.57	14	33.6	1
30.2	42.99	21	61.5	17	39.17	24	25.5	13	5.80	12	54.6	6	3.43	12	33.7	2
Apr. 9.1	42.78	18	59.8	20	38.93	18	24.2	16	5.68	10	54.0	7	3.31	9	33.9	4
19.1	42.60	13	57.8	24	38.75	12	22.6	18	5.58	6	53.3	10	3.22	6	34.3	5
29.1	42.47	9	55.4	27	38.63	4	20.8	18	5.52	2	52.3	12	3.16	2	34.8	6
May 9.1	42.38	3	52.7	30	38.59	4	19.0	19	5.50	3	51.1	13	3.14	3	35.4	8
19.0	42.35	2	49.7	32	38.63	12	17.1	18	5.53	7	49.8	15	3.17	8	36.2	10
29.0	42.37	8	46.5	33	38.75	19	15.3	18	5.60	11	48.3	17	3.25	12	37.2	11
June 8.0	42.45	13	43.2	32	38.94	26	13.5	16	5.71	16	46.6	18	3.37	16	38.3	12
18.0	42.58	18	40.0	32	39.20	33	11.9	14	5.87	19	44.8	18	3.53	19	39.5	12
27.9	42.76	23	36.8	31	39.53	39	10.5	11	6.06	22	43.0	18	3.72	23	40.7	13
July 7.9	42.99	27	33.7	29	39.92	43	9.4	9	6.28	25	41.2	18	3.95	25	42.0	14
17.9	43.26	30	30.8	26	40.35	47	8.5	6	6.53	27	39.4	17	4.20	28	43.4	13
27.8	43.56	32	28.2	21	40.82	50	7.9	3	6.80	29	37.7	15	4.48	30	44.7	12
Aug. 6.8	43.88	34	26.1	17	41.32	52	7.6	0	7.09	29	36.2	13	4.78	30	45.9	11
16.8	44.22	35	24.4	12	41.84	52	7.6	3	7.38	30	34.9	11	5.08	30	47.0	10
26.8	44.57	36	23.2	6	42.36	52	7.9	6	7.68	30	33.8	8	5.38	31	48.0	8
Sept. 5.7	44.93	35	22.6	1	42.88	52	8.5	9	7.98	30	33.0	5	5.69	30	48.8	6
15.7	45.28	34	22.5	5	43.40	51	9.4	11	8.28	28	32.5	2	5.99	30	49.4	3
25.7	45.62	32	23.0	11	43.91	49	10.5	13	8.56	28	32.3	2	6.29	28	49.7	1
Oct. 5.7	45.94	29	24.1	17	44.40	46	11.8	15	8.84	26	32.5	5	6.57	27	49.8	1
15.6	46.23	26	25.8	21	44.86	43	13.3	18	9.10	23	33.0	8	6.84	25	49.7	3
25.6	46.49	23	27.9	25	45.29	39	15.1	19	9.33	22	33.8	10	7.09	23	49.4	5
Nov. 4.6	46.72	19	30.4	28	45.68	34	17.0	21	9.55	19	34.8	12	7.32	20	48.9	7
14.5	46.91	13	33.2	30	46.02	28	19.1	21	9.74	16	36.0	13	7.52	18	48.2	7
24.5	47.04	8	36.2	31	46.30	22	21.2	22	9.90	13	37.3	14	7.70	14	47.5	8
Dec. 4.5	47.12	4	39.3	31	46.52	15	23.4	22	10.03	9	38.7	14	7.84	10	46.7	9
14.5	47.16	1	42.4	29	46.67	8	25.6	21	10.12	6	40.1	13	7.94	7	45.8	8
24.4	47.15	7	45.3	26	46.75	1	27.7	20	10.18	1	41.4	13	8.01	3	45.0	7
34.4	47.08		47.9		46.74		29.7		10.19		42.7		8.04		44.3	
Sec δ, Tan δ	1.346		−0.901		1.817		+1.517		1.002		−0.060		1.007		+0.119	
Mean Place	43ˢ.476		53″.94		40ˢ.078		7″.16		6ˢ.098		54″.83		3ˢ.706		30″.50	
$D'_\psi \alpha$, $D_\omega \alpha$	−0.02		+0.02		+0.04		−0.03		0.00		0.00		0.00		0.00	
$D_\psi \delta$, $D_\omega \delta$	+0.1		+0.9		+0.1		+0.9		+0.1		+0.9		+0.1		+0.9	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	**9 Camelop.** Mag. 4.4				**ι Tauri.** Mag. 5.1				**π^5 Orionis.** Mag. 3.9				**ι Aurigæ.** Mag. 2.9			
	Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination N.	
	h m 4 45		° ′ +66 11		h m 4 46		° ′ +18 41		h m 4 49		° ′ + 2 17		h m 4 51		° ′ +33 1	
	s		″		s		″		s		″		s		″	
Jan. 0.4	19.45		54.6		14.19		35.2		40.77		56.0		16.43		49.6	
10.4	19.36	9	56.9	23	14.18	1	35.1	1	40.76	1	55.0	10	16.43	0	50.4	8
20.4	19.17	19	59.0	21	14.14	4	35.0	1	40.72	4	54.2	8	16.38	5	51.0	6
30.3	18.90	27	60.7	17	14.06	8	35.0	0	40.64	8	53.5	7	16.29	9	51.5	5
Feb. 9.3	18.55	35	62.0	13	13.94	12	34.9	1	40.53	11	53.0	5	16.16	13	51.8	3
19.3	18.14	41	62.8	8	13.80	14	34.8	1	40.39	14	52.6	4	16.00	16	52.0	2
29.3	17.70	44	63.1	3	13.64	16	34.6	2	40.23	16	52.3	3	15.82	18	52.0	0
Mar. 10.2	17.25	45	62.9	2	13.47	17	34.4	2	40.06	17	52.2	1	15.62	20	51.9	1
20.2	16.81	44	62.2	7	13.30	17	34.2	2	39.90	16	52.2	0	15.43	19	51.6	3
30.2	16.40	41	61.1	11	13.15	15	34.0	2	39.75	15	52.4	2	15.26	17	51.1	5
Apr. 9.2	16.05	35	59.7	14	13.02	13	33.9	1	39.62	13	52.8	4	15.11	15	50.5	6
19.1	15.78	27	58.0	17	12.93	9	33.8	1	39.52	10	53.3	5	15.00	11	49.8	7
29.1	15.59	19	56.0	20	12.88	5	33.7	1	39.46	6	54.0	7	14.93	7	49.1	7
May 9.1	15.50	9	53.8	22	12.87	1	33.7	0	39.44	2	54.9	9	14.91	2	48.4	7
19.0	15.52	2	51.5	23	12.90	3	33.8	1	39.46	2	55.9	10	14.94	3	47.7	7
29.0	15.64	12	49.2	23	12.98	8	34.1	3	39.53	7	57.1	12	15.02	8	47.1	6
June 8.0	15.86	22	47.0	22	13.11	13	34.5	4	39.64	11	58.4	13	15.16	14	46.6	5
18.0	16.18	32	45.0	20	13.28	17	35.0	5	39.79	15	59.8	14	15.35	19	46.2	4
27.9	16.58	40	43.2	18	13.49	21	35.6	6	39.98	19	61.3	15	15.58	23	46.0	2
July 7.9	17.06	48	41.6	16	13.73	24	36.3	7	40.20	22	62.9	16	15.85	27	45.9	1
17.9	17.61	55	40.3	13	14.00	27	37.1	8	40.45	25	64.4	15	16.15	30	46.0	1
27.9	18.21	60	39.3	10	14.29	29	37.9	8	40.72	27	65.9	15	16.47	32	46.2	2
Aug. 6.8	18.86	65	38.7	6	14.60	31	38.8	9	41.00	28	67.2	13	16.81	34	46.5	3
16.8	19.54	68	38.4	3	14.92	32	39.7	9	41.30	30	68.4	12	17.17	36	47.0	5
26.8	20.23	69	38.5	1	15.24	32	40.5	8	41.60	30	69.4	10	17.53	36	47.6	6
Sept. 5.7	20.93	70	38.9	4	15.56	32	41.2	7	41.90	30	70.2	8	17.89	36	48.2	6
15.7	21.62	69	39.7	8	15.88	32	41.8	6	42.20	30	70.7	5	18.25	36	48.9	7
25.7	22.30	68	40.8	11	16.19	31	42.4	6	42.49	29	70.9	2	18.60	35	49.6	7
Oct. 5.7	22.95	65	42.2	14	16.49	30	42.8	4	42.77	28	70.8	1	18.94	34	50.3	7
15.6	23.56	61	43.9	17	16.78	29	43.1	3	43.04	27	70.5	3	19.26	32	51.1	8
25.6	24.13	57	45.9	20	17.05	27	43.2	1	43.29	25	70.0	5	19.56	30	51.8	7
Nov. 4.6	24.64	51	48.1	22	17.29	24	43.3	1	43.52	23	69.3	7	19.84	28	52.6	8
14.5	25.08	44	50.5	24	17.51	22	43.3	0	43.73	21	68.4	9	20.09	25	53.4	8
24.5	25.45	37	53.1	26	17.70	19	43.3	0	43.91	18	67.4	10	20.31	22	54.2	8
Dec. 4.5	25.73	28	55.8	27	17.85	15	43.3	0	44.05	14	66.3	11	20.49	18	55.0	8
14.5	25.92	19	58.4	26	17.97	12	43.2	1	44.15	10	65.2	11	20.63	14	55.8	8
24.4	26.00	8	61.0	26	18.04	7	43.1	1	44.21	6	64.2	10	20.72	9	56.6	8
34.4	25.98	2	63.4	24	18.07	3	43.0	1	44.23	2	63.1	11	20.75	3	57.3	7
Sec δ, Tan δ	2.478		+2.267		1.056		+0.338		1.001		+0.040		1.193		+0.650	
Mean Place	17ˢ.698		40″.25		13ˢ.473		27″.14		40ˢ.009		50″.56		15ˢ.637		39″.46	
D′ψ α, Dω α	+0.06		−0.05		+0.01		−0.01		0.00		0.00		+0.02		−0.01	
Dψ δ, Dω δ	+0.1		+0.9		+0.1		+0.9		+0.1		+1.0		+0.1		+1.0	

Mean Solar Date.	β Camelop. Mag. 4.2				ε Aurigæ. Var. 3.0-4.5				ζ Aurigæ. Mag. 3.9				ι Tauri. Mag. 4.7			
	Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination N.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	4 55		+60 18		4 55		+43 41		4 56		+40 56		4 57		+21 27	
	s		″		s		″		s		″		s		″	
Jan. 0.4	36.52		66.7		40.06		49.9		20.36		65.2		50.84		62.2	
10.4	36.48	4	68.8	21	40.06	0	51.3	14	20.36	0	66.4	12	50.86	2	62.3	1
20.4	36.36	12	70.7	19	40.00	6	52.4	11	20.31	5	67.4	10	50.83	3	62.4	1
30.3	36.16	20	72.3	16	39.89	11	53.3	9	20.21	10	68.2	8	50.75	8	62.5	1
Feb. 9.3	35.90	26	73.5	12	39.73	16	54.0	7	20.06	15	68.8	6	50.63	12	62.5	0
19.3	35.59	31	74.3	8	39.54	19	54.5	5	19.88	18	69.2	4	50.48	15	62.5	0
29.3	35.25	34	74.7	4	39.32	22	54.7	2	19.67	21	69.4	2	50.32	16	62.4	1
Mar. 10.2	34.89	36	74.7	0	39.09	23	54.6	1	19.45	22	69.3	1	50.15	17	62.2	2
20.2	34.54	35	74.2	5	38.86	23	54.2	4	19.23	22	69.0	3	49.98	17	62.0	2
30.2	34.21	33	73.3	9	38.65	21	53.6	6	19.03	20	68.4	6	49.82	16	61.8	2
Apr. 9.2	33.92	29	72.1	12	38.47	18	52.7	9	18.86	17	67.6	8	49.68	14	61.6	2
19.1	33.69	23	70.6	15	38.33	14	51.6	11	18.73	13	66.6	10	49.58	10	61.4	2
29.1	33.54	15	68.8	18	38.24	9	50.4	12	18.64	9	65.6	10	49.51	7	61.2	2
May 9.1	33.46	8	66.8	20	38.21	3	49.2	12	18.61	3	64.5	11	49.49	2	61.1	1
19.0	33.47	1	64.7	21	38.24	3	48.0	12	18.64	3	63.4	11	49.52	3	61.0	1
29.0	33.56	9	62.7	20	38.33	9	46.8	12	18.73	9	62.4	10	49.59	7	61.1	1
June 8.0	33.74	18	60.8	19	38.47	14	45.7	11	18.87	14	61.4	10	49.71	12	61.3	2
18.0	34.00	26	59.0	18	38.67	20	44.7	10	19.06	19	60.6	8	49.87	16	61.6	3
27.9	34.33	33	57.3	17	38.92	25	43.8	9	19.30	24	59.9	7	50.07	20	62.0	4
July 7.9	34.73	40	55.8	15	39.22	30	43.1	7	19.59	29	59.4	5	50.31	24	62.5	5
17.9	35.18	45	54.6	12	39.55	33	42.7	4	19.91	32	59.1	3	50.58	27	63.1	6
27.9	35.68	50	53.8	8	39.91	36	42.5	2	20.26	35	58.9	2	50.87	29	63.7	6
Aug. 6.8	36.21	53	53.2	6	40.30	39	42.5	0	20.63	37	58.9	0	51.18	31	64.4	7
16.8	36.77	56	52.9	3	40.70	40	42.6	1	21.02	39	59.1	2	51.50	32	65.1	7
26.8	37.34	57	52.9	0	41.11	41	42.9	3	21.42	40	59.5	4	51.82	32	65.8	7
Sept. 5.7	37.92	58	53.2	3	41.53	42	43.4	5	21.81	39	60.0	5	52.15	33	66.4	6
15.7	38.50	58	53.9	7	41.94	41	44.1	7	22.20	39	60.6	6	52.48	33	67.0	6
25.7	39.07	57	54.8	9	42.34	40	44.9	8	22.59	39	61.3	7	52.80	32	67.5	5
Oct. 5.7	39.62	55	56.0	12	42.73	39	45.8	9	22.97	38	62.2	9	53.11	31	67.9	4
15.6	40.14	52	57.4	14	43.11	38	46.8	10	23.33	36	63.2	10	53.41	30	68.2	3
25.6	40.63	49	59.1	17	43.46	35	47.9	11	23.67	34	64.2	10	53.69	28	68.4	2
Nov. 4.6	41.08	45	61.0	19	43.78	32	49.1	12	23.98	31	65.3	11	53.95	26	68.6	2
14.6	41.48	40	63.1	21	44.07	29	50.4	13	24.26	28	66.4	11	54.18	23	68.7	1
24.5	41.81	33	65.3	22	44.32	25	51.8	14	24.51	25	67.6	12	54.38	20	68.8	1
Dec. 4.5	42.07	26	67.6	23	44.53	21	53.2	14	24.71	20	68.9	13	54.55	17	68.9	1
14.5	42.26	19	70.0	24	44.68	15	54.7	15	24.86	15	70.2	13	54.68	13	68.9	0
24.4	42.37	11	72.3	23	44.78	10	56.1	14	24.95	9	71.4	12	54.77	9	68.9	0
34.4	42.39	2	74.5	22	44.82	4	57.4	13	25.00	5	72.6	12	54.82	5	69.0	1
Sec δ, Tan δ	2.019		+1.755		1.383		+0.956		1.324		+0.868		1.075		+0.393	
Mean Place	$35^{s}.048$		53″.44		$39^{s}.115$		38″.48		$19^{s}.455$		54″.13		$50^{s}.083$		53″.89	
$D'_{\psi}\alpha$, $D_{\omega}\alpha$	+0.05		−0.03		+0.02		−0.02		+0.02		−0.02		+0.01		−0.01	
$D_{\psi}\delta$, $D_{\omega}\delta$	+0.1		+1.0		+0.1		+1.0		+0.1		+1.0		+0.1		+1.0	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	**11 Orionis.** Mag. 4.6				**η Aurigæ.** Mag. 3.3				**ε Leporis.** Mag. 3.3				**β Eridani.** Mag. 2.9			
	Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination S.	
	h m 4 59		° ′ +15 16		h m 5 0		° ′ +41 6		h m 5 1		° ′ −22 28		h m 5 3		° ′ − 5 11	
	s		″		s		″		s		″		s		″	
Jan. 0.4	33.12		63.9		21.44		69.9		45.16		76.8		32.24		53.4	
10.4	33.14	2	63.6	3	21.44	0	71.1	12	45.14	2	78.9	21	32.24	0	54.7	13
20.4	33.11	3	63.4	2	21.39	5	72.1	10	45.07	7	80.7	18	32.20	4	55.9	12
30.4	33.04	7	63.2	2	21.29	10	73.0	9	44.96	11	82.2	15	32.12	8	56.9	10
Feb. 9.3	32.93	11	63.0	2	21.15	14	73.7	7	44.82	14	83.4	12	32.01	11	57.7	8
19.3	32.79	14	62.8	2	20.97	18	74.1	4	44.65	17	84.2	8	31.87	14	58.3	6
29.3	32.63	16	62.7	1	20.76	21	74.3	2	44.46	19	84.6	4	31.71	16	58.7	4
Mar. 10.2	32.47	16	62.6	1	20.54	22	74.2	1	44.26	20	84.7	1	31.54	17	58.8	1
20.2	32.30	17	62.5	1	20.32	22	73.9	3	44.07	19	84.4	3	31.37	17	58.7	1
30.2	32.14	16	62.4	1	20.12	20	73.3	6	43.89	18	83.8	6	31.21	16	58.4	3
Apr. 9.2	32.00	14	62.4	0	19.95	17	72.5	8	43.72	17	82.8	10	31.07	14	57.8	6
19.1	31.90	10	62.4	0	19.81	14	71.6	9	43.58	14	81.5	13	30.96	11	57.0	8
29.1	31.84	6	62.5	1	19.72	9	70.6	10	43.48	10	79.9	16	30.88	8	56.0	10
May 9.1	31.82	2	62.7	2	19.68	4	69.5	11	43.42	6	77.9	20	30.84	4	54.8	12
19.1	31.84	2	63.0	3	19.70	2	68.4	11	43.41	1	75.7	22	30.85	1	53.4	14
29.0	31.91	7	63.4	4	19.78	8	67.3	11	43.44	3	73.3	24	30.90	5	51.9	15
June 8.0	32.02	11	63.9	5	19.92	14	66.3	10	43.52	8	70.8	25	30.99	9	50.3	16
18.0	32.17	15	64.6	7	20.11	19	65.5	8	43.64	12	68.2	26	31.12	13	48.5	18
27.9	32.36	19	65.3	7	20.35	24	64.8	7	43.80	16	65.6	26	31.29	17	46.6	19
July 7.9	32.59	23	66.1	8	20.63	28	64.2	6	43.99	19	63.0	26	31.50	21	44.8	18
17.9	32.85	26	67.0	9	20.95	32	63.8	4	44.22	23	60.6	24	31.73	23	43.0	18
27.9	33.13	28	67.9	9	21.30	35	63.6	2	44.48	26	58.4	22	31.98	25	41.3	17
Aug. 6.8	33.42	29	68.8	9	21.67	37	63.6	0	44.76	28	56.4	20	32.25	27	39.7	16
16.8	33.73	31	69.7	9	22.05	38	63.8	2	45.05	29	54.7	17	32.54	29	38.4	13
26.8	34.05	32	70.5	8	22.45	40	64.1	3	45.35	30	53.4	13	32.84	30	37.3	11
Sept. 5.8	34.36	31	71.2	7	22.85	40	64.5	4	45.66	31	52.6	8	33.14	30	36.5	8
15.7	34.67	31	71.7	5	23.25	40	65.1	6	45.96	30	52.2	4	33.43	29	36.1	4
25.7	34.98	31	72.1	4	23.64	39	65.8	7	46.26	30	52.3	1	33.72	29	36.0	1
Oct. 5.7	35.28	30	72.3	2	24.02	38	66.6	8	46.55	29	52.9	6	34.00	28	36.2	2
15.6	35.57	29	72.4	1	24.38	36	67.5	9	46.83	28	53.9	10	34.27	27	36.8	6
25.6	35.84	27	72.4	0	24.72	34	68.5	10	47.09	26	55.4	15	34.53	26	37.7	9
Nov. 4.6	36.09	25	72.2	2	25.04	32	69.6	11	47.32	23	57.3	19	34.76	23	38.8	11
14.6	36.31	22	72.0	2	25.33	29	70.7	11	47.52	20	59.4	21	34.97	21	40.1	13
24.5	36.51	20	71.7	3	25.58	25	71.9	12	47.69	17	61.7	23	35.15	18	41.6	15
Dec. 4.5	36.67	16	71.4	3	25.79	21	73.1	12	47.82	13	64.1	24	35.30	15	43.2	16
14.5	36.80	13	71.0	4	25.94	15	74.4	13	47.91	9	66.6	25	35.41	11	44.8	16
24.5	36.89	9	70.7	3	26.04	10	75.7	13	47.96	5	69.0	24	35.48	7	46.3	15
34.4	36.93	4	70.4	3	26.09	5	76.9	12	47.97	1	71.2	22	35.51	3	47.7	14
Sec δ, Tan δ	1.037		+0.273		1.327		+0.873		1.082		−0.414		1.004		−0.091	
Mean Place	32ˢ.370		56″.41		20ˢ.505		58″.96		44ˢ.120		79″.08		31ˢ.401		58″.05	
D′ψ α, Dω α	+0.01		0.00		+0.02		−0.02		−0.01		+0.01		0.00		0.00	
Dψ δ, Dω δ	+0.1		+1.0		+0.1		+1.0		+0.1		+1.0		+0.1		+1.0	

Mean Solar Date.	μ Aurigæ. Mag. 4.8				19 H. Camelop. Mag. 5.2				μ Leporis. Mag. 3.3				α Aurigæ. Mag. 0.2			
	Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination N.	
	h m 5 7 s		° ′ +38 22 ″		h m 5 7 s		° ′ +79 7 ″		h m 5 8 s		° ′ −16 18 ″		h m 5 10 s		° ′ +45 54 ″	
Jan. 0.4	25.16	1	62.6	11	66.70	20	70.0	29	59.65	1	29.0	19	12.23	1	45.5	14
10.4	25.17	4	63.7	9	66.50	41	72.9	26	59.64	5	30.9	16	12.24	4	46.9	13
20.4	25.13	8	64.6	8	66.09	61	75.5	23	59.59	9	32.5	14	12.20	10	48.2	11
30.4	25.05	13	65.4	6	65.48	78	77.8	19	59.50	13	33.9	11	12.10	15	49.3	9
Feb. 9.3	24.92	17	66.0	4	64.70	91	79.7	14	59.37	15	35.0	8	11.95	20	50.2	6
19.3	24.75	20	66.4	2	63.79	100	81.1	8	59.22	17	35.8	4	11.75	23	50.8	3
29.3	24.55	21	66.6	0	62.79	104	81.9	2	59.05	18	36.2	2	11.52	24	51.1	0
Mar. 10.2	24.34	21	66.6	3	61.75	103	82.1	4	58.87	19	36.4	2	11.28	24	51.1	3
20.2	24.13	20	66.3	5	60.72	98	81.7	9	58.68	17	36.2	5	11.04	22	50.8	6
30.2	23.93	17	65.8	6	59.74	88	80.8	14	58.51	15	35.7	8	10.82	20	50.2	8
Apr. 9.2	23.76	13	65.2	8	58.86	74	79.4	18	58.36	13	34.9	11	10.62	16	49.4	10
19.1	23.63	9	64.4	9	58.12	57	77.6	22	58.23	10	33.8	14	10.46	11	48.4	12
29.1	23.54	4	63.5	10	57.55	38	75.4	25	58.13	6	32.4	16	10.35	5	47.2	13
May 9.1	23.50	1	62.5	10	57.17	17	72.9	27	58.07	1	30.8	19	10.30	0	45.9	13
19.1	23.51	7	61.5	9	57.00	5	70.2	28	58.06	3	28.9	21	10.30	7	44.6	13
29.0	23.58	12	60.6	8	57.05	26	67.4	27	58.09	7	26.8	22	10.37	13	43.3	12
June 8.0	23.70	18	59.8	7	57.31	46	64.7	26	58.16	12	24.6	23	10.50	19	42.1	12
18.0	23.88	23	59.1	6	57.77	65	62.1	25	58.28	16	22.3	24	10.69	24	40.9	11
27.9	24.11	27	58.5	5	58.42	83	59.6	23	58.44	20	19.9	23	10.93	29	39.8	9
July 7.9	24.38	30	58.0	3	59.25	99	57.3	20	58.64	23	17.6	22	11.22	33	38.9	7
17.9	24.68	33	57.7	1	60.24	113	55.3	16	58.87	25	15.4	21	11.55	36	38.2	5
27.9	25.01	35	57.6	0	61.37	124	53.7	13	59.12	27	13.3	19	11.91	39	37.7	3
Aug. 6.8	25.36	37	57.6	1	62.61	132	52.4	9	59.39	28	11.4	16	12.30	41	37.4	1
16.8	25.73	38	57.7	3	63.93	138	51.5	5	59.67	29	9.8	12	12.71	42	37.3	1
26.8	26.11	39	58.0	4	65.31	142	51.0	0	59.96	30	8.6	8	13.13	43	37.4	3
Sept. 5.8	26.50	38	58.4	5	66.73	143	51.0	4	60.26	30	7.8	4	13.56	43	37.7	4
15.7	26.88	38	58.9	6	68.16	142	51.4	8	60.56	29	7.4	0	13.99	42	38.1	6
25.7	27.26	37	59.5	7	69.58	138	52.2	12	60.85	29	7.4	5	14.41	41	38.7	8
Oct. 5.7	27.63	36	60.2	7	70.96	131	53.4	16	61.14	28	7.9	9	14.82	40	39.5	9
15.6	27.99	34	60.9	8	72.27	122	55.0	20	61.42	26	8.8	13	15.22	38	40.4	10
25.6	28.33	31	61.7	9	73.49	110	57.0	23	61.68	23	10.1	16	15.60	35	41.4	12
Nov. 4.6	28.64	28	62.6	10	74.59	96	59.3	26	61.91	21	11.7	18	15.95	32	42.6	13
14.6	28.92	25	63.6	10	75.55	80	61.9	29	62.12	18	13.5	20	16.27	28	43.9	14
24.5	29.17	20	64.6	10	76.35	61	64.8	30	62.30	15	15.5	22	16.55	23	45.3	15
Dec. 4.5	29.37	16	65.6	11	76.96	40	67.8	31	62.45	11	17.7	22	16.78	18	46.8	15
14.5	29.53	11	66.7	11	77.36	18	70.9	31	62.56	6	19.9	21	16.96	12	48.3	15
24.5	29.64	6	67.8	10	77.54	6	74.0	31	62.62	2	22.0	20	17.08	5	49.8	14
34.4	29.70		68.8		77.48		77.1		62.64		24.0		17.13		51.2	
Sec δ, Tan δ	1.276		+0.792		5.305		+5.210		1.042		−0.293		1.437		+1.032	
Mean Place	24ˢ.233		52″.18		62ˢ.021		56″.09		58ˢ.691		32″.40		11ˢ.163		34″.28	
D′ψ α, Dω α	+0.02		−0.01		+0.13		−0.08		−0.01		0.00		+0.03		−0.01	
Dψ δ, Dω δ	+0.1		+1.0		+0.1		+1.0		+0.1		+1.0		+0.1		+1.0	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	β Orionis. Mag. 0.3				λ Aurigæ. Mag. 4.8				τ Orionis. Mag. 3.7				ο Columbæ. Mag. 4.9			
	Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination S.	
	h m 5 10		° ′ − 8 17		h m 5 12		° ′ +40 1		h m 5 13		° ′ − 6 55		h m 5 14		° ′ −34 58	
	s		″		s		″		s		″		s		″	
Jan. 0.4	19.36		64.9		57.90		29.0		20.86		75.0		19.81		49.6	
10.4	19.36	0	66.4	15	57.93	3	30.1	11	20.87	1	76.4	14	19.77	4	52.2	26
20.4	19.32	4	67.8	14	57.90	3	31.1	10	20.83	4	77.7	13	19.68	9	54.5	23
30.4	19.24	8	68.9	11	57.81	9	32.0	9	20.76	7	78.8	11	19.55	13	56.4	19
Feb. 9.3	19.13	11	69.8	9	57.68	13	32.7	7	20.65	11	79.7	9	19.38	17	57.9	15
19.3	18.99	14	70.4	6	57.51	17	33.2	5	20.51	14	80.3	6	19.18	20	59.0	11
29.3	18.83	16	70.8	4	57.31	20	33.4	2	20.35	16	80.7	4	18.95	23	59.6	6
Mar. 10.3	18.66	17	71.0	2	57.10	21	33.4	0	20.18	17	80.9	2	18.71	24	59.8	2
20.2	18.49	17	70.9	1	56.88	22	33.2	2	20.01	17	80.8	1	18.47	24	59.5	3
30.2	18.32	17	70.5	4	56.68	20	32.7	5	19.85	16	80.5	3	18.24	23	58.8	7
Apr. 9.2	18.17	15	69.9	6	56.50	18	32.0	7	19.70	15	79.9	6	18.03	21	57.7	11
19.1	18.05	12	69.1	8	56.36	14	31.2	8	19.58	12	79.1	8	17.85	18	56.1	16
29.1	17.97	8	68.0	11	56.26	10	30.2	10	19.50	8	78.1	10	17.71	14	54.2	19
May 9.1	17.92	5	66.7	13	56.21	5	29.1	11	19.45	5	76.8	13	17.61	10	51.9	23
19.1	17.92	0	65.2	15	56.22	1	28.1	10	19.44	1	75.4	14	17.56	5	49.4	25
29.0	17.96	4	63.5	17	56.29	7	27.1	10	19.48	4	73.8	16	17.56	0	46.7	27
June 8.0	18.04	8	61.7	18	56.41	12	26.2	9	19.56	8	72.1	17	17.61	5	43.8	29
18.0	18.16	12	59.8	19	56.58	17	25.3	9	19.68	12	70.3	18	17.70	9	40.7	31
28.0	18.32	16	57.8	20	56.81	23	24.5	8	19.84	16	68.4	19	17.84	14	37.7	30
July 7.9	18.52	20	55.8	20	57.08	27	23.9	6	20.04	20	66.5	19	18.02	18	34.8	29
17.9	18.75	23	53.9	19	57.38	30	23.5	4	20.26	22	64.6	19	18.24	22	32.0	28
27.9	19.00	25	52.1	18	57.71	33	23.3	2	20.51	25	62.9	17	18.50	26	29.4	26
Aug. 6.8	19.27	27	50.5	16	58.07	36	23.2	1	20.78	27	61.3	16	18.79	29	27.1	23
16.8	19.55	28	49.1	14	58.45	38	23.2	0	21.06	28	59.9	14	19.09	30	25.2	19
26.8	19.84	29	48.0	11	58.84	39	23.4	2	21.35	29	58.8	11	19.40	31	23.8	14
Sept. 5.8	20.14	30	47.2	8	59.23	39	23.7	3	21.64	29	58.0	8	19.73	33	22.9	9
15.7	20.44	30	46.7	5	59.63	40	24.1	4	21.94	30	57.6	4	20.06	33	22.5	4
25.7	20.73	29	46.6	1	60.02	39	24.6	5	22.23	29	57.5	1	20.39	33	22.7	2
Oct. 5.7	21.01	28	46.9	3	60.40	38	25.2	6	22.52	29	57.8	3	20.70	31	23.5	8
15.6	21.29	28	47.6	7	60.77	37	25.9	7	22.80	28	58.4	6	21.00	30	24.8	13
25.6	21.55	26	48.6	10	61.12	35	26.7	8	23.06	26	59.3	9	21.28	28	26.6	18
Nov. 4.6	21.79	24	49.9	13	61.44	32	27.6	9	23.30	24	60.5	12	21.54	26	28.8	22
14.6	22.00	21	51.4	15	61.74	30	28.6	10	23.52	22	61.9	14	21.76	22	31.3	25
24.5	22.18	18	53.0	16	62.00	26	29.6	10	23.71	19	63.5	16	21.94	18	34.1	28
Dec. 4.5	22.33	15	54.7	17	62.22	22	30.7	11	23.86	15	65.2	17	22.08	14	37.0	29
14.5	22.45	12	56.5	18	62.39	17	31.8	11	23.98	12	66.9	17	22.17	9	40.0	30
24.5	22.53	8	58.2	17	62.51	12	33.0	12	24.06	8	68.6	17	22.21	4	42.9	29
34.4	22.56	3	59.8	16	62.58	7	34.2	12	24.10	4	70.2	16	22.20	1	45.7	28
Sec δ, Tan δ	1.011		−0.146		1.306		+0.840		1.007		−0.122		1.220		−0.700	
Mean Place	$18^{s}.480$		$69''.36$		$56^{s}.933$		$18''.56$		$19^{s}.989$		$79''.66$		$18^{s}.499$		$51''.40$	
$D'_\psi \alpha$, $D_\omega \alpha$	0.00		0.00		+0.02		−0.01		0.00		0.00		−0.02		+0.01	
$D_\psi \delta$, $D_\omega \delta$	+0.1		+1.0		+0.1		+1.0		+0.1		+1.0		+0.1		+1.0	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	γ Orionis. Mag. 1.7				β Tauri. Mag. 1.8				17 Camelop. Mag. 5.8				β Leporis. Mag. 3.0			
	Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination S.	
	h m 5 20 s		° ′ + 6 16 ″		h m 5 20 s		° ′ +28 32 ″		h m 5 21 s		° ′ +62 59 ″		h m 5 24 s		° ′ −20 49 ″	
Jan. 0.4	25.44		20.9		44.55		11.3		53.20		53.8		29.53		40.5	
10.4	25.47	3	20.1	8	44.58	3	11.8	5	53.21	1	56.2	24	29.53	0	42.7	22
20.4	25.45	2	19.4	7	44.56	2	12.3	5	53.12	9	58.3	21	29.48	5	44.6	19
30.4	25.39	6	18.8	6	44.50	6	12.7	4	52.94	18	60.1	18	29.40	8	46.2	16
Feb. 9.3	25.30	9	18.3	5	44.40	10	13.0	3	52.68	26	61.6	15	29.27	13	47.5	13
19.3	25.17	13	18.0	3	44.26	14	13.2	2	52.36	32	62.8	12	29.11	16	48.5	10
29.3	25.02	15	17.7	3	44.09	17	13.3	1	51.99	37	63.6	8	28.93	18	49.1	6
Mar. 10.3	24.86	16	17.6	1	43.91	18	13.3	0	51.60	39	63.9	3	28.74	19	49.4	3
20.2	24.69	17	17.6	0	43.72	19	13.2	1	51.20	40	63.7	2	28.55	19	49.3	1
30.2	24.53	16	17.7	1	43.54	18	13.0	2	50.82	38	63.0	7	28.36	19	48.8	5
Apr. 9.2	24.39	14	17.9	2	43.39	15	12.6	4	50.48	34	62.0	10	28.18	18	48.0	8
19.1	24.27	12	18.2	3	43.26	13	12.2	4	50.20	28	60.6	14	28.03	15	46.8	12
29.1	24.19	8	18.7	5	43.17	9	11.8	4	49.98	22	58.9	17	27.92	11	45.4	14
May 9.1	24.15	4	19.3	6	43.13	4	11.3	5	49.84	14	57.0	19	27.85	7	43.7	17
19.1	24.15	0	20.1	8	43.14	1	10.9	4	49.79	5	54.9	21	27.82	3	41.7	20
29.0	24.19	4	21.0	9	43.19	5	10.5	4	49.84	5	52.8	21	27.83	1	39.5	22
June 8.0	24.27	8	22.0	10	43.29	10	10.2	3	49.98	14	50.7	21	27.88	5	37.1	24
18.0	24.40	13	23.1	11	43.44	15	10.0	2	50.20	22	48.6	21	27.98	10	34.7	24
28.0	24.56	16	24.2	11	43.63	19	9.9	1	50.51	31	46.7	19	28.12	14	32.2	25
July 7.9	24.76	20	25.4	12	43.86	23	9.9	0	50.89	38	44.9	18	28.30	18	29.7	25
17.9	24.99	23	26.7	13	44.13	27	10.0	1	51.34	45	43.3	16	28.51	21	27.3	24
27.9	25.25	26	27.9	12	44.42	29	10.2	2	51.84	50	42.0	13	28.75	24	25.1	22
Aug. 6.8	25.53	28	29.0	11	44.73	31	10.4	2	52.39	55	41.0	10	29.01	26	23.1	20
16.8	25.81	28	30.0	10	45.05	32	10.7	3	52.97	58	40.3	7	29.29	28	21.4	17
26.8	26.10	29	30.8	8	45.39	34	11.1	4	53.58	61	39.9	4	29.58	29	20.1	13
Sept. 5.8	26.40	30	31.5	7	45.74	35	11.5	4	54.20	62	39.8	1	29.88	30	19.2	9
15.7	26.71	31	31.9	4	46.08	34	11.9	4	54.83	63	40.0	2	30.19	31	18.7	5
25.7	27.01	30	32.1	2	46.42	34	12.2	3	55.46	63	40.5	5	30.49	30	18.7	0
Oct. 5.7	27.30	29	32.1	0	46.76	34	12.6	4	56.08	62	41.4	9	30.79	30	19.2	5
15.7	27.59	29	31.9	2	47.09	33	12.9	3	56.68	60	42.6	12	31.07	28	20.2	10
25.6	27.87	28	31.4	5	47.41	32	13.3	4	57.24	56	44.0	14	31.34	27	21.6	14
Nov. 4.6	28.12	25	30.7	7	47.70	29	13.6	3	57.76	52	45.7	17	31.59	25	23.3	17
14.6	28.35	23	29.9	8	47.97	27	13.9	3	58.23	47	47.7	20	31.81	22	25.3	20
24.5	28.55	20	29.0	9	48.21	24	14.3	4	58.64	41	49.9	22	32.00	19	27.6	23
Dec. 4.5	28.73	18	28.0	10	48.41	20	14.7	4	58.98	34	52.2	23	32.16	16	30.0	24
14.5	28.87	14	27.0	10	48.57	16	15.1	4	59.24	26	54.5	23	32.28	12	32.5	25
24.5	28.97	10	26.1	9	48.69	12	15.5	4	59.40	16	56.9	24	32.36	8	34.9	24
34.4	29.02	5	25.2	9	48.76	7	16.0	5	59.47	7	59.2	23	32.39	3	37.2	23
Sec δ, Tan δ	1.006		+0.110		1.138		+0.544		2.203		+1.962		1.070		−0.380	
Mean Place	$24^{s}.626$		14''.49		$43^{s}.679$		2''.38		$51^{s}.345$		41''.74		$28^{s}.488$		44''.17	
$D'_{\psi}\alpha$, $D_{\omega}\alpha$	0.00		0.00		+0.01		−0.01		+0.05		−0.02		−0.01		0.00	
$D_{\psi}\delta$, $D_{\omega}\delta$	+0.1		+1.0		+0.1		+1.0		+0.1		+1.0		+0.1		+1.0	

Mean Solar Date.	χ Aurigæ. Mag. 4.9				δ Orionis. Mag. 2.5				Groombridge 966. Mag. 6.4				α Leporis. Mag. 2.7			
	Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination S.	
	h m 5 26		° ′ +32 7		h m 5 27		° ′ − 0 21		h m 5 27		° ′ +74 59		h m 5 28		° ′ −17 52	
	s		″		s		″		s		″		s		″	
Jan. 0.5	60.87		49.2		31.47		43.0		60.62		27.0		51.93		60.7	
10.4	60.91	4	49.9	7	31.50	3	44.2	12	60.58	4	29.8	28	51.94	1	62.7	20
20.4	60.90	1	50.6	7	31.48	2	45.2	10	60.37	21	32.5	27	51.91	3	64.5	18
30.4	60.84	6	51.2	6	31.42	6	46.1	9	60.01	36	34.8	23	51.83	8	66.1	16
Feb. 9.3	60.73	11	51.7	5	31.32	10	46.8	7	59.51	50	36.7	19	51.71	12	67.4	13
19.3	60.58	15	52.1	4	31.20	12	47.3	5	58.90	61	38.2	15	51.56	15	68.3	9
29.3	60.41	17	52.3	2	31.05	15	47.7	4	58.22	68	39.2	10	51.39	17	68.9	6
Mar. 10.3	60.23	18	52.3	0	30.88	17	47.9	2	57.50	72	39.6	4	51.20	19	69.2	3
20.2	60.04	19	52.2	1	30.71	17	47.9	0	56.76	74	39.5	1	51.01	19	69.1	1
30.2	59.85	19	52.0	2	30.55	16	47.7	2	56.05	71	38.9	6	50.83	18	68.7	4
Apr. 9.2	59.68	17	51.6	4	30.40	15	47.3	4	55.40	65	37.8	11	50.66	17	68.0	7
19.2	59.55	13	51.1	5	30.28	12	46.7	6	54.84	56	36.2	16	50.52	14	67.0	10
29.1	59.45	10	50.5	6	30.19	9	46.0	7	54.39	45	34.2	20	50.41	11	65.7	13
May 9.1	59.40	5	49.9	6	30.14	5	45.1	9	54.08	31	32.0	22	50.33	8	64.1	16
19.1	59.40	0	49.3	6	30.13	1	44.1	10	53.92	16	29.5	25	50.30	3	62.2	19
29.0	59.45	5	48.7	6	30.16	3	42.9	12	53.91	1	26.9	26	50.31	1	60.1	21
June 8.0	59.55	10	48.2	5	30.24	8	41.5	14	54.05	14	24.3	26	50.37	6	57.9	22
18.0	59.69	14	47.8	4	30.35	11	40.1	14	54.35	30	21.7	26	50.47	10	55.6	23
28.0	59.88	19	47.4	4	30.50	15	38.6	15	54.80	45	19.2	25	50.61	14	53.2	24
July 7.9	60.11	23	47.2	2	30.69	19	37.0	16	55.37	57	16.9	23	50.78	17	50.9	23
17.9	60.38	27	47.1	1	30.91	22	35.5	15	56.06	69	14.8	21	50.98	20	48.6	23
27.9	60.68	30	47.1	0	31.15	24	34.1	14	56.86	80	13.0	18	51.21	23	46.4	22
Aug. 6.9	61.00	32	47.1	0	31.41	26	32.7	14	57.75	89	11.6	14	51.47	26	44.5	19
16.8	61.33	33	47.3	2	31.69	28	31.5	12	58.70	95	10.5	11	51.75	28	42.9	16
26.8	61.68	35	47.5	2	31.98	29	30.6	9	59.71	101	9.8	7	52.04	29	41.6	13
Sept. 5.8	62.03	35	47.8	3	32.28	30	29.9	7	60.76	105	9.5	3	52.34	30	40.7	9
15.7	62.39	36	48.1	3	32.58	30	29.4	5	61.82	106	9.6	1	52.64	30	40.3	4
25.7	62.75	36	48.4	3	32.87	29	29.3	1	62.88	106	10.1	5	52.94	30	40.3	0
Oct. 5.7	63.10	35	48.8	4	33.16	29	29.5	2	63.93	105	11.0	9	53.24	30	40.7	4
15.7	63.44	34	49.2	4	33.45	29	30.0	5	64.94	101	12.2	12	53.52	28	41.5	8
25.6	63.77	33	49.6	4	33.72	27	30.7	7	65.89	95	13.8	16	53.79	27	42.8	13
Nov. 4.6	64.08	31	50.0	4	33.98	26	31.7	10	66.77	88	15.7	19	54.04	25	44.5	17
14.6	64.36	28	50.5	5	34.22	24	32.8	11	67.56	79	18.0	23	54.27	23	46.4	19
24.6	64.61	25	51.0	5	34.42	20	34.1	13	68.23	67	20.6	26	54.47	20	48.5	21
Dec. 4.5	64.83	22	51.6	6	34.59	17	35.5	14	68.77	54	23.3	27	54.63	16	50.8	23
14.5	65.01	18	52.2	6	34.73	14	36.9	14	69.17	40	26.2	29	54.75	12	53.1	23
24.5	65.14	13	52.9	7	34.83	10	38.2	13	69.40	23	29.1	29	54.84	9	55.4	23
34.4	65.21	7	53.6	7	34.88	5	39.5	13	69.46	6	32.0	29	54.87	3	57.6	22
Sec δ, Tan δ	1.181		+0.628		1.000		−0.006		3.861		+3.730		1.051		−0.323	
Mean Place	$59^{s}.951$		$40''.08$		$30^{s}.616$		$48''.78$		$57^{s}.022$		$14''.52$		$50^{s}.928$		$64''.78$	
$D'_\psi a$, $D_\omega a$	+0.02		−0.01		0.00		0.00		+0.10		−0.03		−0.01		0.00	
$D_\psi \delta$, $D_\omega \delta$	+0.1		+1.0		+0.1		+1.0		+0.1		+1.0		+0.1		+1.0	

FOR THE UPPER TRANSIT AT WASHINGTON.

ean Solar Date.	ϕ^1 Orionis. Mag. 4.5				ι Orionis. Mag. 2.9				ε Orionis. Mag. 1.8				ζ Tauri. Mag. 3.0			
	Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination S.		Right Ascension.		Declination N.	
	h m 5 29		° ′ + 9 25		h m 5 31		° ′ − 5 57		h m 5 31		° ′ − 1 15		h m 5 32		° ′ +21 5	
	s		″		s		″		s		″		s		″	
n. 0.5	60.15		57.2		8.58		55.9		45.72		20.7		23.96		30.5	
10.4	60.19	4	56.6	6	8.61	3	57.4	15	45.75	3	22.0	13	24.00	4	30.5	0
20.4	60.18	1	56.0	6	8.59	2	58.7	13	45.74	1	23.1	11	24.00	0	30.6	1
30.4	60.12	6	55.5	5	8.53	6	59.8	11	45.68	6	24.0	9	23.95	5	30.7	1
b. 9.3	60.03	9	55.1	4	8.43	10	60.7	9	45.59	9	24.7	7	23.86	9	30.8	1
19.3	59.91	12	54.8	3	8.30	13	61.4	7	45.46	13	25.3	6	23.73	13	30.8	0
29.3	59.76	15	54.6	2	8.14	16	61.9	5	45.31	15	25.7	4	23.57	16	30.8	0
ar. 10.3	59.60	16	54.5	1	7.97	17	62.1	2	45.15	16	25.9	2	23.40	17	30.8	0
20.2	59.43	17	54.5	0	7.80	17	62.1	0	44.98	17	25.9	0	23.23	17	30.8	0
30.2	59.27	16	54.6	1	7.64	16	61.9	2	44.82	16	25.7	2	23.06	17	30.7	1
r. 9.2	59.13	14	54.8	2	7.49	15	61.4	5	44.67	15	25.3	4	22.91	15	30.6	1
19.2	59.01	12	55.0	2	7.36	13	60.7	7	44.54	13	24.7	6	22.78	13	30.5	1
29.1	58.92	9	55.3	3	7.26	10	59.8	9	44.44	10	23.9	8	22.69	9	30.4	1
ay 9.1	58.87	5	55.7	4	7.20	6	58.6	12	44.38	6	23.0	9	22.64	5	30.3	1
19.1	58.86	1	56.3	6	7.18	2	57.3	13	44.37	1	22.0	10	22.64	0	30.2	1
29.0	58.90	4	57.0	7	7.20	2	55.8	15	44.40	3	20.8	12	22.68	4	30.3	1
ne 8.0	58.98	8	57.8	8	7.26	6	54.2	16	44.47	7	19.4	14	22.76	8	30.4	1
18.0	59.10	12	58.7	9	7.37	11	52.5	17	44.58	11	17.9	15	22.89	13	30.6	2
28.0	59.26	16	59.7	10	7.52	15	50.7	18	44.73	15	16.3	16	23.06	17	30.9	3
ly 7.9	59.45	19	60.7	10	7.70	18	48.9	18	44.91	18	14.7	16	23.27	21	31.2	3
17.9	59.68	23	61.7	10	7.91	21	47.1	18	45.12	21	13.2	15	23.51	24	31.6	4
27.9	59.93	25	62.7	10	8.15	24	45.4	17	45.36	24	11.8	14	23.77	26	32.1	5
g. 6.9	60.20	27	63.6	9	8.41	26	43.9	15	45.62	26	10.5	13	24.06	29	32.6	5
16.8	60.48	28	64.5	9	8.68	27	42.6	13	45.90	28	9.3	12	24.36	30	33.1	5
26.8	60.78	30	65.3	8	8.96	28	41.5	11	46.19	29	8.3	10	24.68	32	33.5	4
pt. 5.8	61.08	30	65.9	6	9.25	29	40.7	8	46.48	29	7.5	8	25.00	32	33.9	4
15.7	61.39	31	66.3	4	9.55	30	40.3	4	46.78	30	7.0	5	25.33	33	34.2	3
25.7	61.70	31	66.5	2	9.85	30	40.2	1	47.08	30	6.9	1	25.65	32	34.4	2
t. 5.7	62.00	30	66.5	0	10.14	29	40.4	2	47.37	29	7.1	2	25.97	32	34.6	2
15.7	62.29	29	66.3	2	10.42	28	41.0	6	47.65	28	7.6	5	26.28	31	34.7	1
25.6	62.57	28	65.9	4	10.69	27	41.9	9	47.92	27	8.4	8	26.58	30	34.6	1
ov. 4.6	62.84	27	65.3	6	10.94	25	43.1	12	48.18	26	9.4	10	26.87	29	34.5	1
14.6	63.08	24	64.6	7	11.17	23	44.5	14	48.42	24	10.6	12	27.14	27	34.4	1
24.6	63.30	22	63.8	8	11.38	21	46.1	16	48.63	21	12.0	14	27.38	24	34.3	1
ec. 4.5	63.49	19	63.0	8	11.56	18	47.8	17	48.81	18	13.5	15	27.58	20	34.2	1
14.5	63.64	15	62.2	8	11.70	14	49.5	17	48.95	14	14.9	14	27.74	16	34.1	1
24.5	63.75	11	61.4	8	11.80	10	51.2	17	49.05	10	16.3	14	27.86	12	34.0	1
34.4	63.82	7	60.7	7	11.85	5	52.8	16	49.11	6	17.6	13	27.94	8	34.0	0
δ, Tan δ	1.014		+0.166		1.005		−0.104		1.000		−0.022		1.072		+0.386	
n Place	59ˢ.315		50″.39		7ˢ.688		61″.19		44ˢ.858		26″.48		23ˢ.096		22″.58	
α, $D_\omega \alpha$	0.00		0.00		0.00		0.00		0.00		0.00		+0.01		0.00	
δ, $D_\omega \delta$	0.0		+1.0		0.0		+1.0		0.0		+1.0		0.0		+1.0	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	ζ Orionis. Mag. 2.0				α Columbæ. Mag. 2.8				o Aurigæ. Mag. 5.5				ζ Leporis. Mag. 3.7			
	Right Ascension.		Declination S.		Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination S.	
	h m 5 36		° ′ − 1 58		h m 5 36		° ′ −34 6		h m 5 39		° ′ +49 47		h m 5 42		° ′ −14 50	
	s		″		s		″		s		″		s		″	
Jan. 0.5	19.97		72.9		29.06		70.7		6.20		29.6		59.04		69.8	
10.4	20.00	3	74.2	13	29.04	2	73.4	27	6.25	5	31.3	17	59.07	3	71.8	20
20.4	19.99	1	75.4	12	28.97	7	75.8	24	6.23	2	32.9	16	59.05	2	73.6	18
30.4	19.94	5	76.4	10	28.86	11	77.9	21	6.15	8	34.4	15	58.98	7	75.1	15
Feb. 9.3	19.85	9	77.2	8	28.70	16	79.6	17	6.01	14	35.6	12	58.88	10	76.3	12
19.3	19.72	13	77.8	6	28.51	19	80.9	13	5.82	19	36.5	9	58.74	14	77.3	10
29.3	19.57	15	78.2	4	28.30	21	81.8	9	5.59	23	37.2	7	58.58	16	78.0	7
Mar. 10.3	19.41	16	78.4	2	28.07	23	82.2	4	5.33	26	37.6	4	58.40	18	78.3	3
20.2	19.24	17	78.4	0	27.83	24	82.1	1	5.06	27	37.6	0	58.22	18	78.3	0
30.2	19.07	17	78.2	2	27.60	23	81.6	5	4.80	26	37.2	4	58.03	19	78.0	3
Apr. 9.2	18.92	15	77.8	4	27.38	22	80.7	9	4.56	24	36.5	7	57.86	17	77.4	6
19.2	18.79	13	77.2	6	27.19	19	79.3	14	4.36	20	35.6	9	57.71	15	76.5	9
29.1	18.70	9	76.4	8	27.03	16	77.6	17	4.21	15	34.5	11	57.60	11	75.4	11
May 9.1	18.64	6	75.5	9	26.92	11	75.6	20	4.12	9	33.2	13	57.53	7	74.0	14
19.1	18.62	2	74.4	11	26.85	7	73.2	24	4.08	4	31.7	15	57.49	4	72.3	17
29.0	18.64	2	73.1	13	26.82	3	70.6	26	4.11	3	30.2	15	57.49	0	70.5	18
June 8.0	18.70	6	71.7	14	26.84	2	67.8	28	4.21	10	28.7	15	57.53	4	68.5	20
18.0	18.81	11	70.2	15	26.91	7	64.9	29	4.37	16	27.2	15	57.62	9	66.3	22
28.0	18.95	14	68.7	15	27.03	12	62.0	29	4.58	21	25.8	14	57.75	13	64.1	22
July 7.9	19.13	18	67.1	16	27.19	16	59.0	30	4.85	27	24.6	12	57.91	16	61.9	22
17.9	19.34	21	65.5	16	27.39	20	56.2	28	5.17	32	23.5	11	58.11	20	59.8	21
27.9	19.58	24	64.0	15	27.62	23	53.6	26	5.53	36	22.6	9	58.33	22	57.8	20
Aug. 6.9	19.84	26	62.6	14	27.88	26	51.3	23	5.92	39	21.9	7	58.58	25	56.0	18
16.8	20.11	27	61.4	12	28.17	29	49.3	20	6.34	42	21.4	5	58.85	27	54.4	16
26.8	20.39	28	60.4	10	28.48	31	47.8	15	6.78	44	21.0	4	59.13	28	53.1	13
Sept. 5.8	20.68	29	59.7	7	28.80	32	46.8	10	7.23	45	20.8	2	59.42	29	52.2	9
15.7	20.98	30	59.3	4	29.13	33	46.2	6	7.69	46	20.8	0	59.72	30	51.7	5
25.7	21.28	30	59.2	1	29.45	32	46.2	0	8.15	46	21.1	3	60.02	30	51.6	1
Oct. 5.7	21.57	29	59.4	2	29.78	33	46.8	6	8.60	45	21.6	5	60.32	30	52.0	4
15.7	21.86	29	59.9	5	30.09	31	47.9	11	9.04	44	22.2	6	60.61	29	52.8	8
25.6	22.13	27	60.7	8	30.38	29	49.6	17	9.47	43	23.0	8	60.88	27	54.0	12
Nov. 4.6	22.39	26	61.8	11	30.65	27	51.7	21	9.88	41	24.1	11	61.14	26	55.5	15
14.6	22.63	24	63.0	12	30.89	24	54.2	25	10.25	37	25.3	12	61.38	24	57.3	18
24.6	22.85	22	64.4	14	31.10	21	56.9	27	10.58	33	26.7	14	61.59	21	59.3	20
Dec. 4.5	23.04	19	65.9	15	31.26	16	59.8	29	10.87	29	28.2	15	61.77	18	61.5	22
14.5	23.18	14	67.4	15	31.38	12	62.8	30	11.10	23	29.8	16	61.91	14	63.8	23
24.5	23.28	10	68.9	15	31.45	7	65.8	30	11.26	16	31.5	17	62.01	10	65.9	21
34.4	23.35	7	70.3	14	31.47	2	68.6	28	11.36	10	33.2	17	62.07	6	68.0	21
Sec δ, Tan δ	1.001		−0.035		1.208		−0.677		1.549		+1.183		1.035		−0.265	
Mean Place	$19^{s}.093$		78″.69		$27^{s}.747$		74″.04		$4^{s}.882$		19″.44		$58^{s}.055$		74″.71	
$D'_\psi\alpha$, $D_\omega\alpha$	0.00		0.00		−0.02		0.00		+0.03		−0.01		−0.01		0.00	
$D_\psi\delta$, $D_\omega\delta$	0.0		+1.0		0.0		+1.0		0.0		+1.0		0.0		+1.0	

ean Solar Date	κ Orionis. Mag. 2.2				δ Doradus. Mag. 4.5				ν Aurigæ. Mag. 4.2				δ Leporis. Mag. 3.9			
	Right Ascension.		Declination S.		Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination S.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	5 43		− 9 41		5 44		−65 45		5 45		+39 7		5 47		−20 52	
	s		″		s		″		s		″		s		″	
n. 0.5	35.90		55.4		40.10		63.9		24.49		34.5		33.25		64.6	
10.4	35.93	3	57.1	17	39.92	18	67.1	32	24.55	6	35.6	11	33.27	2	66.9	23
20.4	35.92	1	58.7	16	39.65	27	70.1	30	24.56	1	36.6	10	33.24	3	68.9	20
30.4	35.86	6	60.0	13	39.29	36	72.7	26	24.51	5	37.6	10	33.17	7	70.7	18
b. 9.4	35.76	10	61.1	11	38.86	43	74.8	21	24.40	11	38.4	8	33.06	11	72.2	15
19.3	35.63	13	61.9	8	38.37	49	76.4	16	24.25	15	39.1	7	32.92	14	73.3	11
29.3	35.48	15	62.5	6	37.83	54	77.5	11	24.07	18	39.6	5	32.75	17	74.1	8
ar.10.3	35.31	17	62.8	3	37.26	57	78.0	5	23.86	21	39.9	3	32.56	19	74.6	5
20.2	35.13	18	62.8	0	36.69	57	78.0	0	23.65	21	39.9	0	32.36	20	74.7	1
30.2	34.96	17	62.6	2	36.13	56	77.5	5	23.44	21	39.7	2	32.17	19	74.4	3
pr. 9.2	34.80	16	62.1	5	35.59	54	76.4	11	23.25	19	39.3	4	31.99	18	73.7	7
19.2	34.66	14	61.3	8	35.10	49	74.9	15	23.09	16	38.7	6	31.83	16	72.7	10
29.1	34.55	11	60.3	10	34.66	44	72.9	20	22.97	12	38.0	7	31.70	13	71.4	13
ay 9.1	34.48	7	59.1	12	34.28	38	70.5	24	22.89	8	37.1	9	31.61	9	69.8	16
19.1	34.45	3	57.7	14	33.98	30	67.7	28	22.86	3	36.1	10	31.56	5	68.0	18
29.1	34.46	1	56.1	16	33.76	22	64.6	31	22.89	3	35.2	9	31.55	1	66.0	20
ne 8.0	34.51	5	54.3	18	33.63	13	61.3	33	22.98	9	34.3	9	31.58	3	63.8	22
18.0	34.60	9	52.4	19	33.59	4	57.9	34	23.11	13	33.4	9	31.65	7	61.4	24
28.0	34.73	13	50.5	19	33.65	6	54.4	35	23.29	18	32.6	8	31.77	12	58.9	25
ly 7.9	34.90	17	48.5	20	33.80	15	51.0	34	23.52	23	31.9	7	31.93	16	56.5	24
17.9	35.10	20	46.6	19	34.03	23	47.7	33	23.79	27	31.3	6	32.12	19	54.2	23
27.9	35.32	22	44.8	18	34.34	31	44.7	30	24.09	30	30.8	5	32.34	22	52.0	22
ug. 6.9	35.57	25	43.2	16	34.73	39	42.0	27	24.42	33	30.4	4	32.58	24	50.0	20
16.8	35.83	26	41.8	14	35.18	45	39.7	23	24.77	35	30.1	3	32.84	26	48.3	17
26.8	36.11	28	40.6	12	35.68	50	37.9	18	25.14	37	29.9	2	33.13	29	46.9	14
pt. 5.8	36.40	29	39.8	8	36.21	53	36.6	13	25.52	38	29.9	0	33.43	30	45.9	10
15.8	36.70	30	39.3	5	36.77	56	36.0	6	25.91	39	30.0	1	33.74	31	45.4	5
25.7	37.00	30	39.2	1	37.34	57	36.1	1	26.30	39	30.2	2	34.04	30	45.3	1
ct. 5.7	37.29	29	39.5	3	37.90	56	36.8	7	26.69	39	30.4	2	34.34	30	45.7	4
15.7	37.58	29	40.2	7	38.43	53	38.1	13	27.07	38	30.8	4	34.64	30	46.6	9
25.6	37.86	28	41.3	11	38.92	49	40.0	19	27.43	36	31.3	5	34.93	29	48.0	14
ov. 4.6	38.12	26	42.6	13	39.36	44	42.5	25	27.78	35	31.8	5	35.20	27	49.7	17
14.6	38.36	24	44.2	16	39.73	37	45.4	29	28.11	33	32.5	7	35.44	24	51.8	21
24.6	38.57	21	46.0	18	40.01	28	48.7	33	28.40	29	33.3	8	35.65	21	54.1	23
ec. 4.5	38.75	18	47.9	19	40.20	19	52.2	35	28.65	25	34.2	9	35.83	18	56.5	24
14.5	38.90	15	49.9	20	40.29	9	55.8	36	28.86	21	35.1	9	35.97	14	59.0	25
24.5	39.01	11	51.8	19	40.28	1	59.3	35	29.02	16	36.1	10	36.07	10	61.6	26
34.5	39.07	6	53.6	18	40.16	12	62.7	34	29.12	10	37.2	11	36.12	5	64.0	24
δ, Tan δ	1.015		−0.171		2.436		−2.222		1.289		+0.813		1.070		−0.382	
n Place	34ˢ.962		60″.76		36ˢ.802		66″.72		23ˢ.412		25″.31		32ˢ.186		69″.27	
α, D_w α	0.00		0.00		−0.06		+0.01		+0.02		0.00		−0.01		0.00	
δ, D_w δ	0.0		+1.0		0.0		+1.0		0.0		+1.0		0.0		+1.0	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	α Orionis. Var. 1.0–1.4				δ Aurigæ. Mag. 3.9				η Leporis. Mag. 3.8				β Aurigæ. Mag. 2.1			
	Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination N.	
	h m 5 50		° ′ + 7 23		h m 5 52		° ′ +54 16		h m 5 52		° ′ − 14 10		h m 5 53		° ′ +44 56	
	s		″		s		″		s		″		s		″	
Jan. 0.5	25.31	6	35.8	8	18.48	7	54.7	20	24.78	4	54.0	19	5.69	7	31.5	14
10.4	25.37	1	35.0	7	18.55	0	56.7	18	24.82	1	55.9	18	5.76	1	32.9	14
20.4	25.38	4	34.3	6	18.55	8	58.5	17	24.81	6	57.7	15	5.77	6	34.3	13
30.4	25.34	8	33.7	4	18.47	15	60.2	15	24.75	9	59.2	13	5.71	11	35.6	11
Feb. 9.4	25.26	11	33.3	4	18.32	21	61.7	12	24.66	13	60.5	10	5.60	16	36.7	9
19.3	25.15	14	32.9	2	18.11	26	62.9	9	24.53	16	61.5	7	5.44	20	37.6	7
29.3	25.01	16	32.7	1	17.85	29	63.8	5	24.37	18	62.2	4	5.24	22	38.3	4
Mar. 10.3	24.85	17	32.6	0	17.56	29	64.3	1	24.19	19	62.6	1	5.02	24	38.7	1
20.3	24.68	17	32.6	0	17.27	28	64.4	2	24.00	18	62.7	3	4.78	23	38.8	2
30.2	24.51	15	32.6	2	16.99	27	64.2	6	23.82	16	62.4	5	4.55	21	38.6	4
Apr. 9.2	24.36	13	32.8	3	16.72	24	63.6	9	23.66	15	61.9	8	4.34	19	38.2	7
19.2	24.23	10	33.1	4	16.48	19	62.7	12	23.51	12	61.1	11	4.15	15	37.5	9
29.1	24.13	6	33.5	5	16.29	13	61.5	14	23.39	8	60.0	13	4.00	10	36.6	10
May 9.1	24.07	3	34.0	7	16.16	6	60.1	16	23.31	5	58.7	16	3.90	4	35.6	12
19.1	24.04	2	34.7	7	16.10	0	58.5	17	23.26	1	57.1	18	3.86	2	34.4	13
29.1	24.06	6	35.4	8	16.10	8	56.8	17	23.25	4	55.3	20	3.88	7	33.1	13
June 8.0	24.12	10	36.2	10	16.18	15	55.1	18	23.29	8	53.3	21	3.95	13	31.8	12
18.0	24.22	14	37.2	10	16.33	21	53.3	17	23.37	12	51.2	21	4.08	19	30.6	11
28.0	24.36	17	38.2	11	16.54	27	51.6	16	23.49	15	49.1	21	4.27	23	29.5	10
July 7.9	24.53	20	39.3	10	16.81	33	50.0	14	23.64	19	47.0	21	4.50	28	28.5	10
17.9	24.73	23	40.3	10	17.14	37	48.6	12	23.83	22	44.9	20	4.78	32	27.5	9
27.9	24.96	26	41.3	10	17.51	42	47.4	11	24.05	24	42.9	18	5.10	35	26.6	7
Aug. 6.9	25.22	28	42.3	9	17.93	44	46.3	9	24.29	26	41.1	15	5.45	38	25.9	6
16.8	25.50	29	43.2	7	18.37	47	45.4	6	24.55	28	39.6	13	5.83	39	25.3	4
26.8	25.79	29	43.9	5	18.84	49	44.8	4	24.83	29	38.3	9	6.22	41	24.9	
Sept. 5.8	26.08	30	44.4	3	19.33	50	44.4	2	25.12	29	37.4	5	6.63	42	24.7	1
15.8	26.38	31	44.7	1	19.83	50	44.2	1	25.41	30	36.9	1	7.05	43	24.6	1
25.7	26.69	30	44.8	1	20.33	51	44.3	3	25.71	30	36.8	3	7.48	42	24.7	
Oct. 5.7	26.99	30	44.7	4	20.84	49	44.6	6	26.01	29	37.1	8	7.90	41	24.9	
15.7	27.29	29	44.3	5	21.33	48	45.2	8	26.30	28	37.9	12	8.31	41	25.3	
25.6	27.58	28	43.8	7	21.81	45	46.0	10	26.58	27	39.1	15	8.72	38	25.8	
Nov. 4.6	27.86	26	43.1	9	22.26	43	47.0	13	26.85	25	40.6	18	9.10	36	26.5	
14.6	28.12	23	42.2	10	22.69	38	48.3	15	27.10	22	42.4	20	9.46	33	27.4	
24.6	28.35	20	41.2	10	23.07	33	49.8	16	27.32	18	44.4	22	9.79	28	28.4	
Dec. 4.5	28.55	17	40.2	10	23.40	26	51.4	18	27.50	15	46.6	22	10.07	23	29.6	
14.5	28.72	13	39.2	10	23.66	20	53.2	19	27.65	11	48.8	22	10.30	18	30.9	
24.5	28.85	8	38.2	9	23.86	12	55.1	19	27.76	7	51.0	20	10.48	12	32.2	
34.5	28.93		37.3		23.98		57.0		27.83		53.0		10.60		33.6	
Sec δ, Tan δ	1.008		+0.130		1.713		+1.391		1.031		−0.253		1.413		+0.99	
Mean Place	24ˢ.443		29″.14		16ˢ.927		44″.98		23ˢ.800		59″.25		4ˢ.455		22″.30	
D′ψ α, Dω α	0.00		0.00		+0.04		0.00		−0.01		0.00		+0.03		0.00	
Dψ δ, Dω δ	0.0		+1.0		0.0		+1.0		0.0		+1.0		0.0		+1.0	

APPARENT PLACES OF STARS, 1912.

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	θ Aurigæ. Mag. 2.7				1 Geminorum. Mag. 4.3				1 Puppis (G.) Mag. 6.2				ν Orionis. Mag. 4.4			
	Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination N.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	5 53		+37 12		5 58		+23 16		6 1		−45 1		6 2		+14 46	
	s		″		s		″		s		″		s		″	
Jan. 0.5	44.30		35.0		47.20		15.5		58.10		65.4		33.77		54.2	
10.4	44.37	7	36.0	10	47.27	7	15.6	1	58.08	2	68.6	32	33.84	7	53.8	4
20.4	44.39	2	37.0	10	47.29	2	15.8	2	58.00	8	71.5	29	33.86	2	53.5	3
30.4	44.35	4	37.9	9	47.26	3	16.0	2	57.87	13	74.1	26	33.84	2	53.3	2
Feb. 9.4	44.26	9	38.7	8	47.19	7	16.3	3	57.68	19	76.2	21	33.78	6	53.1	2
19.3	44.12	14	39.3	6	47.08	11	16.5	2	57.45	23	77.9	17	33.67	11	53.0	1
29.3	43.94	18	39.8	5	46.93	15	16.7	2	57.19	26	79.1	12	33.53	14	53.0	0
Mar. 10.3	43.74	20	40.1	3	46.76	17	16.8	1	56.91	28	79.8	7	33.37	16	53.0	0
20.3	43.53	21	40.2	1	46.58	18	16.8	0	56.62	29	80.0	2	33.20	17	53.0	0
30.2	43.33	20	40.1	1	46.41	17	16.8	0	56.32	30	79.8	2	33.03	17	53.0	0
Apr. 9.2	43.14	19	39.8	3	46.25	16	16.7	1	56.04	28	79.1	7	32.88	15	53.1	1
19.2	42.98	16	39.3	5	46.11	14	16.6	1	55.78	26	77.9	12	32.74	14	53.2	1
29.1	42.86	12	38.6	7	46.00	11	16.5	1	55.56	22	76.2	17	32.63	11	53.4	2
May 9.1	42.78	8	37.9	7	45.93	7	16.3	2	55.38	18	74.1	21	32.56	7	53.6	2
19.1	42.75	3	37.1	8	45.90	3	16.2	1	55.24	14	71.7	24	32.53	3	53.9	3
29.1	42.77	2	36.2	9	45.92	2	16.1	1	55.15	9	69.0	27	32.54	1	54.2	3
June 8.0	42.84	7	35.4	8	45.98	6	16.0	1	55.11	4	66.1	29	32.59	5	54.6	4
18.0	42.96	12	34.6	8	46.08	10	16.0	0	55.13	2	63.0	31	32.69	10	55.1	5
28.0	43.13	17	33.9	7	46.23	15	16.1	1	55.21	8	59.8	32	32.83	14	55.6	5
July 8.0	43.35	22	33.2	7	46.42	19	16.2	1	55.33	12	56.6	32	33.00	17	56.2	6
17.9	43.60	25	32.6	6	46.64	22	16.3	1	55.50	17	53.5	31	33.21	21	56.8	6
27.9	43.89	29	32.1	5	46.89	25	16.5	2	55.72	22	50.6	29	33.44	23	57.4	6
Aug. 6.9	44.21	32	31.7	4	47.16	27	16.7	2	55.98	26	47.9	27	33.70	26	58.0	6
16.8	44.55	34	31.5	2	47.45	29	16.9	2	56.28	30	45.6	23	33.97	27	58.5	5
26.8	44.90	35	31.3	2	47.76	31	17.1	2	56.60	32	43.8	18	34.26	29	58.9	4
Sept. 5.8	45.27	37	31.2	1	48.08	32	17.3	2	56.94	34	42.5	13	34.56	30	59.3	4
15.8	45.65	38	31.2	0	48.41	33	17.4	1	57.30	36	41.7	8	34.87	31	59.5	2
25.7	46.03	38	31.3	1	48.74	33	17.4	0	57.66	36	41.5	2	35.18	31	59.5	0
Oct. 5.7	46.41	38	31.4	1	49.07	33	17.4	0	58.03	37	41.9	4	35.50	32	59.4	1
15.7	46.78	37	31.6	2	49.40	33	17.3	1	58.39	36	43.0	11	35.81	31	59.1	3
25.7	47.14	36	31.9	3	49.72	32	17.2	1	58.73	34	44.7	17	36.12	31	58.7	4
Nov. 4.6	47.49	35	32.3	4	50.03	31	17.0	2	59.05	32	46.9	22	36.41	29	58.2	5
14.6	47.82	33	32.9	6	50.32	29	16.8	2	59.33	28	49.5	26	36.69	28	57.6	6
24.6	48.12	30	33.5	6	50.59	27	16.6	2	59.57	24	52.5	30	36.94	25	56.9	7
Dec. 4.5	48.38	26	34.2	7	50.82	23	16.5	1	59.77	20	55.7	32	37.16	22	56.3	6
14.5	48.59	21	35.0	8	51.01	19	16.4	1	59.91	14	59.0	33	37.35	19	55.7	6
24.5	48.76	17	35.9	9	51.16	15	16.4	0	59.99	8	62.4	34	37.50	15	55.2	5
34.5	48.87	11	36.8	9	51.27	11	16.5	1	60.01	2	65.7	33	37.60	10	54.7	5
Sec δ, Tan δ	1.256		+0.759		1.089		+0.430		1.415		−1.001		1.034		+0.264	
Mean Place	43ˢ.227		26″.34		46ˢ.268		7″.91		56ˢ.453		70″.05		32ˢ.878		47″.10	
D′ψ α, Dω α	+0.02		0.00		+0.01		0.00		−0.03		0.00		+0.01		0.00	
Dψ δ, Dω δ	0.0		+1.0		0.0		+1.0		0.0		+1.0		0.0		+1.0	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	**22 H. Camelop.** Mag. 4.7				**η Geminorum.** Var. 3.2–4.2				**2 Lyncis.** Mag. 4.4				**ζ Canis Majoris.** Mag. 3.1			
	Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination S.	
	h m 6 9		° ′ +69 21		h m 6 9		° ′ +22 31		h m 6 11		° ′ +59 2		h m 6 16		° ′ −30 1	
	s		″		s		″		s		″		s		″	
Jan. 0.5	12.05	11	17.6	26	34.93	8	66.6	1	53.62	10	47.5	22	57.23	4	20.6	28
10.5	12.16	2	20.2	26	35.01	3	66.7	1	53.72	2	49.7	21	57.27	2	23.4	26
20.4	12.14	14	22.8	24	35.04	2	66.8	2	53.74	7	51.8	20	57.25	7	26.0	23
30.4	12.00	26	25.2	21	35.02	6	67.0	2	53.67	15	53.8	18	57.18	11	28.3	19
Feb. 9.4	11.74	36	27.3	18	34.96	11	67.2	2	53.52	22	55.6	15	57.07	15	30.2	16
19.3	11.38	44	29.1	13	34.85	14	67.4	2	53.30	28	57.1	11	56.92	19	31.8	12
29.3	10.94	49	30.4	9	34.71	16	67.6	1	53.02	32	58.2	8	56.73	21	33.0	8
Mar. 10.3	10.45	52	31.3	4	34.55	17	67.7	1	52.70	34	59.0	4	56.52	22	33.8	3
20.3	9.93	52	31.7	1	34.38	17	67.8	1	52.36	34	59.4	0	56.30	22	34.1	1
30.2	9.41	50	31.6	6	34.21	17	67.9	0	52.02	32	59.4	5	56.08	21	34.0	5
Apr. 9.2	8.91	45	31.0	10	34.04	15	67.9	1	51.70	29	58.9	8	55.87	19	33.5	9
19.2	8.46	37	30.0	15	33.89	11	67.8	1	51.41	24	58.1	12	55.68	17	32.6	13
29.2	8.09	29	28.5	18	33.78	8	67.7	1	51.17	18	56.9	15	55.51	14	31.3	16
May 9.1	7.80	19	26.7	21	33.70	4	67.6	1	50.99	11	55.4	17	55.37	9	29.7	20
19.1	7.61	8	24.6	23	33.66	1	67.5	1	50.88	3	53.7	18	55.28	5	27.7	22
29.1	7.53	3	22.3	24	33.67	5	67.4	0	50.85	4	51.9	19	55.23	1	25.5	24
June 8.0	7.56	14	19.9	24	33.72	9	67.4	0	50.89	12	50.0	20	55.22	3	23.1	26
18.0	7.70	25	17.5	24	33.81	14	67.4	1	51.01	19	48.0	20	55.25	8	20.5	27
28.0	7.95	35	15.1	24	33.95	18	67.5	1	51.20	27	46.0	20	55.33	12	17.8	27
July 8.0	8.30	44	12.7	22	34.13	21	67.6	1	51.47	33	44.0	18	55.45	16	15.1	27
17.9	8.74	53	10.5	20	34.34	24	67.7	2	51.80	38	42.2	16	55.61	19	12.4	26
27.9	9.27	61	8.5	18	34.58	26	67.9	2	52.18	43	40.6	14	55.80	23	9.8	23
Aug. 6.9	9.88	67	6.7	15	34.84	28	68.1	2	52.61	47	39.2	12	56.03	25	7.5	21
16.9	10.55	71	5.2	12	35.12	30	68.3	1	53.08	51	38.0	10	56.28	28	5.4	17
26.8	11.26	75	4.0	9	35.42	32	68.4	1	53.59	54	37.0	8	56.56	29	3.7	12
Sept. 5.8	12.01	78	3.1	6	35.74	32	68.5	0	54.13	56	36.2	5	56.85	31	2.5	7
15.8	12.79	80	2.5	2	36.06	33	68.5	0	54.69	56	35.7	2	57.16	32	1.8	2
25.7	13.59	81	2.3	2	36.39	33	68.5	1	55.25	57	35.5	1	57.48	32	1.6	3
Oct. 5.7	14.40	80	2.5	5	36.72	33	68.4	2	55.82	56	35.6	4	57.80	32	1.9	9
15.7	15.20	77	3.0	9	37.05	32	68.2	3	56.38	55	36.0	6	58.12	31	2.8	14
25.7	15.97	73	3.9	12	37.37	31	67.9	3	56.93	53	36.6	9	58.43	29	4.2	18
Nov. 4.6	16.70	68	5.1	16	37.68	30	67.6	3	57.46	50	37.5	12	58.72	27	6.0	23
14.6	17.38	61	6.7	19	37.98	27	67.3	2	57.96	45	38.7	15	58.99	24	8.3	26
24.6	17.99	53	8.6	22	38.25	24	67.1	2	58.41	39	40.2	17	59.23	21	10.9	28
Dec. 4.6	18.52	43	10.8	24	38.49	21	66.9	2	58.80	33	41.9	20	59.44	17	13.7	29
14.5	18.95	31	13.2	26	38.70	16	66.7	1	59.13	25	43.9	20	59.61	12	16.6	30
24.5	19.26	19	15.8	26	38.86	12	66.6	0	59.38	16	45.9	21	59.73	7	19.6	29
34.5	19.45		18.4		38.98		66.6		59.54		48.0		59.80		22.5	
Sec δ, Tan δ	2.836		+2.654		1.083		+0.415		1.944		+1.667		1.155		−0.578	
Mean Place	$9^{s}.132$		8″.16		$33^{s}.985$		59″.25		$51^{s}.711$		38″.65		$56^{s}.020$		26″.47	
$D'_{\psi}\alpha$, $D_{\omega}\alpha$	+0.07		+0.01		+0.01		0.00		+0.05		+0.01		−0.02		0.00	
$D_{\psi}\delta$, $D_{\omega}\delta$	0.0		+1.0		0.0		+1.0		0.0		+1.0		0.0		+1.0	

Mean Solar Date.	*μ* **Geminorum.** Mag. 3.2				*ψ*¹ **Aurigæ.** Mag. 5.1				*β* **Canis Majoris.** Mag. 2.0				**8 Monocerotis.** Mag. 4.5			
	Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination N.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	6 17		+22 33		6 18		+49 20		6 18		−17 54		6 19		+ 4 38	
	s		″		s		″		s		″		s		″	
Jan. 0.5	39.19		41.8		8.86		10.1		50.48		35.3		7.23		24.5	
10.5	39.28	9	41.9	1	8.97	11	11.8	17	50.54	6	37.6	23	7.31	8	23.4	11
20.4	39.32	4	42.0	1	9.01	4	13.4	16	50.54	0	39.7	21	7.34	3	22.5	9
30.4	39.31	1	42.2	2	8.98	3	15.0	16	50.50	4	41.5	18	7.32	2	21.7	8
Feb. 9.4	39.25	6	42.4	2	8.88	10	16.4	14	50.42	8	43.1	16	7.26	6	21.1	6
19.3	39.15	10	42.6	2	8.72	16	17.7	13	50.30	12	44.4	13	7.17	9	20.6	5
29.3	39.01	14	42.8	2	8.51	21	18.7	10	50.14	16	45.3	9	7.04	13	20.3	3
Mar. 10.3	38.85	16	43.0	2	8.28	23	19.4	7	49.96	18	45.9	6	6.88	16	20.1	2
20.3	38.68	17	43.1	1	8.03	25	19.8	4	49.78	18	46.2	3	6.72	16	20.1	0
30.2	38.51	17	43.2	1	7.77	26	19.8	0	49.59	19	46.1	1	6.55	17	20.2	1
Apr. 9.2	38.34	17	43.2	0	7.52	25	19.5	3	49.41	18	45.7	4	6.40	15	20.4	2
19.2	38.19	15	43.2	0	7.30	22	18.9	6	49.24	17	44.9	8	6.26	14	20.7	3
29.2	38.07	12	43.1	1	7.12	18	18.1	8	49.10	14	43.9	10	6.14	12	21.2	5
May 9.1	37.99	8	43.0	1	6.99	13	17.0	11	49.00	10	42.6	13	6.06	8	21.8	6
19.1	37.95	4	42.9	1	6.91	8	15.7	13	48.93	7	41.0	16	6.01	5	22.5	7
29.1	37.95	0	42.8	1	6.89	2	14.3	14	48.89	4	39.2	18	6.00	1	23.3	8
June 8.0	37.99	4	42.8	0	6.93	4	12.8	15	48.90	1	37.2	20	6.03	3	24.2	9
18.0	38.08	9	42.8	0	7.03	10	11.3	15	48.95	5	35.1	21	6.11	8	25.2	10
28.0	38.21	13	42.8	0	7.20	17	9.8	15	49.04	9	32.9	22	6.22	11	26.3	11
July 8.0	38.38	17	42.9	1	7.42	22	8.3	15	49.17	13	30.6	23	6.36	14	27.4	11
17.9	38.58	20	43.0	1	7.68	26	6.9	14	49.33	16	28.4	22	6.54	18	28.5	11
27.9	38.81	23	43.1	1	7.99	31	5.7	12	49.53	20	26.3	21	6.75	21	29.6	11
Aug. 6.9	39.07	26	43.2	1	8.34	35	4.6	11	49.75	22	24.4	19	6.98	23	30.5	9
16.9	39.35	28	43.3	1	8.72	38	3.6	10	50.00	25	22.7	17	7.24	26	31.4	9
26.8	39.65	30	43.4	1	9.13	41	2.8	8	50.26	26	21.3	14	7.51	27	32.1	7
Sept. 5.8	39.96	31	43.4	0	9.56	43	2.2	6	50.54	28	20.3	10	7.79	28	32.6	5
15.8	40.28	32	43.4	0	10.01	45	1.8	4	50.83	29	19.7	6	8.08	29	32.8	2
25.7	40.61	33	43.3	1	10.46	45	1.5	3	51.13	30	19.6	1	8.38	30	32.8	0
Oct. 5.7	40.94	33	43.1	2	10.92	46	1.4	1	51.43	30	19.9	3	8.69	31	32.6	2
15.7	41.27	33	42.8	3	11.38	46	1.6	2	51.73	30	20.6	7	8.99	30	32.1	5
25.7	41.60	33	42.5	3	11.83	45	1.9	3	52.03	30	21.8	12	9.29	30	31.3	8
Nov. 4.6	41.91	31	42.2	3	12.26	43	2.4	5	52.32	29	23.4	16	9.58	29	30.4	9
14.6	42.21	30	41.9	3	12.67	41	3.2	8	52.58	26	25.3	19	9.85	27	29.3	11
24.6	42.49	28	41.6	3	13.05	38	4.2	10	52.82	24	27.5	22	10.10	25	28.1	12
Dec. 4.6	42.74	25	41.3	3	13.38	33	5.4	12	53.03	21	29.8	23	10.33	23	26.8	13
14.5	42.96	22	41.1	2	13.66	28	6.8	14	53.21	18	32.3	25	10.52	19	25.5	13
24.5	43.13	17	40.9	2	13.88	22	8.3	15	53.34	13	34.8	25	10.68	16	24.3	12
34.5	43.25	12	40.9	0	14.04	16	9.9	16	53.43	9	37.1	23	10.79	11	23.2	11
Sec δ, Tan δ	1.083		+0.415		1.535		+1.164		1.051		−0.323		1.003		+0.081	
Mean Place	$38^{s}.233$		34″.64		$7^{s}.408$		2″.04		$49^{s}.447$		41″.43		$6^{s}.324$		17″.90	
$D'_{\psi}\alpha$, $D_{\omega}\alpha$	+0.01		0.00		+0.03		+0.01		−0.01		0.00		0.00		0.00	
$D_{\psi}\delta$, $D_{\omega}\delta$	0.0		+1.0		0.0		+1.0		0.0		+1.0		0.0		+1.0	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	**α Argûs.** Mag. -0.9				**10 Monocerotis.** Mag. 5.0				**ν Geminorum.** Mag. 4.1				**8 Lyncis.** Mag. 6.0			
	Right Ascension.		Declination S.		Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination N.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	6 21		−52 38		6 23		− 4 42		6 23		+20 16		6 29		+61 33	
	s		″		s		″		s		″		s		″	
Jan. 0.5	61.88		44.3		37.83		18.8		45.24		14.2		41.32		42.9	
10.5	61.87	1	47.7	34	37.90	7	20.4	16	45.33	9	14.1	1	41.46	14	45.2	23
20.4	61.78	9	50.9	32	37.93	3	21.8	14	45.37	4	14.1	0	41.51	5	47.5	23
30.4	61.63	15	53.8	29	37.91	2	23.1	13	45.37	0	14.2	1	41.46	5	49.6	21
Feb. 9.4	61.42	21	56.3	25	37.85	6	24.2	11	45.32	5	14.3	1	41.32	14	51.6	20
19.4	61.15	27	58.3	20	37.75	10	25.0	8	45.22	10	14.4	1	41.10	22	53.4	18
29.3	60.84	31	59.9	16	37.62	13	25.6	6	45.09	13	14.6	2	40.82	28	54.8	14
Mar. 10.3	60.50	34	60.9	10	37.47	15	26.0	4	44.94	15	14.7	1	40.48	34	55.8	10
20.3	60.15	35	61.4	5	37.30	17	26.1	1	44.77	17	14.9	2	40.11	37	56.4	6
30.2	59.79	36	61.5	1	37.12	18	26.0	1	44.60	17	15.0	1	39.74	37	56.5	1
Apr. 9.2	59.44	35	61.0	5	36.96	16	25.7	3	44.43	17	15.0	0	39.38	36	56.2	3
19.2	59.12	32	60.0	10	36.81	15	25.2	5	44.28	15	15.1	1	39.05	33	55.5	7
29.2	58.82	30	58.5	15	36.68	13	24.6	6	44.16	12	15.1	0	38.77	28	54.4	11
May 9.1	58.56	26	56.6	19	36.59	9	23.7	9	44.08	8	15.1	0	38.54	23	53.0	14
19.1	58.36	20	54.3	23	36.54	5	22.6	11	44.03	5	15.1	0	38.39	15	51.3	17
29.1	58.21	15	51.6	27	36.52	2	21.4	12	44.02	1	15.1	0	38.31	8	49.4	19
June 8.1	58.12	9	48.7	29	36.54	2	20.0	14	44.06	4	15.2	1	38.32	1	47.4	20
18.0	58.09	3	45.6	31	36.60	6	18.5	15	44.14	8	15.3	1	38.41	9	45.3	21
28.0	58.12	3	42.4	32	36.70	10	16.9	16	44.26	12	15.4	1	38.58	17	43.1	22
July 8.0	58.21	9	39.1	33	36.83	13	15.4	15	44.42	16	15.6	2	38.82	24	41.0	21
17.9	58.36	15	35.8	33	37.00	17	13.8	16	44.62	20	15.8	2	39.14	32	38.9	21
27.9	58.56	20	32.7	31	37.20	20	12.3	15	44.84	22	16.1	3	39.52	38	37.0	19
Aug. 6.9	58.81	25	29.9	28	37.42	22	10.9	14	45.09	25	16.3	2	39.95	43	35.3	17
16.9	59.11	30	27.4	25	37.66	24	9.7	12	45.36	27	16.5	2	40.44	49	33.8	15
26.8	59.45	34	25.3	21	37.92	26	8.7	10	45.65	29	16.6	1	40.96	52	32.5	13
Sept. 5.8	59.82	37	23.8	15	38.20	28	8.0	7	45.95	30	16.6	0	41.51	55	31.4	11
15.8	60.21	39	22.8	10	38.49	29	7.6	4	46.27	32	16.5	1	42.09	58	30.6	8
25.8	60.62	41	22.5	3	38.78	29	7.5	1	46.59	32	16.4	1	42.70	61	30.1	5
Oct. 5.7	61.03	41	22.8	3	39.08	30	7.8	3	46.91	32	16.2	2	43.32	62	29.9	2
15.7	61.44	41	23.7	9	39.38	30	8.4	6	47.24	33	15.9	3	43.93	61	30.0	1
25.7	61.84	40	25.2	15	39.67	29	9.4	10	47.57	33	15.5	4	44.53	60	30.4	4
Nov. 4.6	62.21	37	27.3	21	39.96	29	10.6	12	47.88	31	15.0	5	45.11	58	31.2	8
14.6	62.54	33	29.9	26	40.23	27	12.0	14	48.18	30	14.5	5	45.65	54	32.3	11
24.6	62.83	29	32.9	30	40.48	25	13.6	16	48.46	28	14.1	4	46.16	51	33.6	13
Dec. 4.6	63.06	23	36.2	33	40.70	22	15.4	18	48.71	25	13.6	5	46.61	45	35.3	17
14.5	63.23	17	39.7	35	40.89	19	17.3	19	48.92	21	13.2	4	46.98	37	37.2	19
24.5	63.33	10	43.3	36	41.04	15	19.1	18	49.10	18	12.9	3	47.28	30	39.3	21
34.5	63.36	3	46.8	35	41.14	10	20.8	17	49.23	13	12.7	2	47.49	21	41.5	22
Sec δ, Tan δ	1.648		−1.310		1.003		−0.082		1.066		+0.369		2.100		+1.846	
Mean Place	59ˢ.906		50″.46		36ˢ.898		25″.20		44ˢ.290		7″.26		39ˢ.144		35″.25	
D′ψ α, Dω α	−0.03		−0.01		0.00		0.00		+0.01		0.00		+0.05		+0.02	
Dψ δ, Dω δ	0.0		+1.0		0.0		+1.0		0.0		+1.0		−0.1		+1.0	

FOR THE UPPER TRANSIT AT WASHINGTON.

an Solar Date.	23 H. Camelop. Mag. 5.6				ξ² Canis Majoris. Mag. 4.5				51 Aurigæ. Mag. 5.7				γ Geminorum. Mag. 1.9			
	Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination N.	
	h m 6 31		° ′ +79 39		h m 6 31		° ′ −22 53		h m 6 32		° ′ +39 28		h m 6 32		° ′ +16 28	
	s		″		s		″		s		″		s		″	
n. 0.5	20.53	23	50.9	30	23.19	7	31.7	26	34.95	13	16.7	10	38.66	10	37.3	3
10.5	20.76	2	53.9	30	23.26	1	34.3	23	35.08	6	17.7	11	38.76	6	37.0	3
20.4	20.74	26	56.9	28	23.27	4	36.6	21	35.14	0	18.8	11	38.82	0	36.7	2
30.4	20.48	49	59.7	26	23.23	8	38.7	18	35.14	7	19.9	11	38.82	5	36.5	1
b. 9.4	19.99	70	62.3	22	23.15	13	40.5	15	35.07	12	21.0	9	38.77	9	36.4	0
19.4	19.29	86	64.5	18	23.02	16	42.0	12	34.95	15	21.9	8	38.68	12	36.4	1
29.3	18.43	98	66.3	13	22.86	18	43.2	8	34.80	18	22.7	7	38.56	15	36.5	1
ar. 10.3	17.45	106	67.6	7	22.68	20	44.0	4	34.62	21	23.4	4	38.41	16	36.6	1
20.3	16.39	109	68.3	1	22.48	20	44.4	0	34.41	22	23.8	2	38.25	17	36.7	1
30.2	15.30	106	68.4	4	22.28	19	44.4	3	34.19	20	24.0	1	38.08	16	36.8	1
pr. 9.2	14.24	98	68.0	10	22.09	17	44.1	7	33.99	18	23.9	3	37.92	15	36.9	1
19.2	13.26	87	67.0	14	21.92	15	43.4	11	33.81	16	23.6	5	37.77	12	37.0	2
29.2	12.39	73	65.6	19	21.77	13	42.3	14	33.65	12	23.1	7	37.65	9	37.2	1
ay 9.1	11.66	55	63.7	23	21.64	9	40.9	16	33.53	7	22.4	8	37.56	5	37.3	2
19.1	11.11	35	61.4	25	21.55	5	39.3	19	33.46	2	21.6	9	37.51	2	37.5	2
29.1	10.76	15	58.9	28	21.50	1	37.4	21	33.44	3	20.7	10	37.49	3	37.7	3
me 8.1	10.61	6	56.1	28	21.49	3	35.3	23	33.47	8	19.7	10	37.52	7	38.0	3
18.0	10.67	28	53.3	29	21.52	7	33.0	24	33.55	13	18.7	10	37.59	11	38.3	4
28.0	10.95	49	50.4	29	21.59	11	30.6	24	33.68	17	17.7	9	37.70	15	38.7	3
uly 8.0	11.44	68	47.5	27	21.70	15	28.2	24	33.85	22	16.8	9	37.85	18	39.0	4
17.9	12.12	85	44.8	26	21.85	18	25.8	23	34.07	26	15.9	9	38.03	21	39.4	4
27.9	12.97	101	42.2	23	22.03	21	23.5	21	34.33	29	15.0	8	38.24	23	39.8	3
ug. 6.9	13.98	116	39.9	20	22.24	24	21.4	18	34.62	32	14.2	8	38.47	26	40.1	3
16.9	15.14	128	37.9	18	22.48	26	19.6	15	34.94	34	13.4	6	38.73	28	40.4	2
26.8	16.42	138	36.1	14	22.74	28	18.1	12	35.28	36	12.8	5	39.01	29	40.6	1
ept. 5.8	17.80	145	34.7	10	23.02	29	16.9	7	35.64	37	12.3	5	39.30	31	40.7	0
15.8	19.25	150	33.7	7	23.31	30	16.2	2	36.01	39	11.8	4	39.61	31	40.7	2
25.8	20.75	152	33.0	2	23.61	31	16.0	2	36.40	40	11.4	3	39.92	32	40.5	3
ct. 5.7	22.27	152	32.8	3	23.92	31	16.2	7	36.80	39	11.1	2	40.24	32	40.2	4
15.7	23.79	148	33.1	7	24.23	31	16.9	12	37.19	39	10.9	0	40.56	32	39.8	5
25.7	25.27	142	33.8	11	24.54	29	18.1	17	37.58	38	10.9	1	40.88	31	39.3	7
ov. 4.6	26.69	133	34.9	16	24.83	28	19.8	21	37.96	37	11.0	2	41.19	30	38.6	7
14.6	28.02	120	36.5	20	25.11	25	21.9	24	38.33	34	11.2	4	41.49	28	37.9	7
24.6	29.22	103	38.5	23	25.36	22	24.3	25	38.67	31	11.6	5	41.77	25	37.2	7
ec. 4.6	30.25	84	40.8	26	25.58	19	26.8	26	38.98	26	12.1	7	42.02	22	36.5	6
14.5	31.09	63	43.4	28	25.77	14	29.4	27	39.24	22	12.8	9	42.24	18	35.9	6
24.5	31.72	39	46.2	30	25.91	9	32.1	27	39.46	16	13.7	10	42.42	13	35.3	5
34.5	32.11		49.2		26.00		34.8		39.62		14.7		42.55		34.8	
δ, Tan δ	5.573		+5.483		1.086		−0.422		1.296		+0.824		1.043		+0.296	
an Place	14ˢ.073		42″.89		22ˢ.107		38″.31		33ˢ.736		9″.62		37ˢ.728		30″.59	
α, $D_{\infty}\alpha$	+0.14		+0.05		−0.01		0.00		+0.02		+0.01		+0.01		0.00	
δ, $D_{\infty}\delta$	−0.1		+1.0		−0.1		+1.0		−0.1		+1.0		−0.1		+1.0	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	ν Argûs. Mag. 3.2				δ Monocerotis. Mag. 4.7				ε Geminorum. Mag. 3.2				ξ Geminorum. Mag. 3.4			
	Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination N.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	6 35		−43 6		6 36		+ 9 58		6 38		+25 13		6 40		+12 59	
	s		″		s		″		s		″		s		″	
Jan. 0.5	5.72		59.2		8.84		47.0		32.13		15.6		21.98		35.2	
10.5	5.76	4	62.4	32	8.94	10	46.2	8	32.25	12	15.7	1	22.09	11	34.6	6
20.4	5.73	3	65.5	31	8.99	5	45.6	6	32.31	6	15.9	2	22.14	5	34.1	5
30.4	5.64	9	68.3	28	8.99	0	45.0	6	32.32	1	16.2	3	22.15	1	33.7	4
Feb. 9.4	5.49	15	70.8	25	8.95	4	44.6	4	32.28	4	16.6	4	22.11	4	33.4	3
19.4	5.30	19	72.8	20	8.86	9	44.4	2	32.19	9	17.0	4	22.03	8	33.3	1
29.3	5.07	23	74.4	16	8.74	12	44.2	2	32.06	13	17.4	4	21.91	12	33.3	0
Mar. 10.3	4.81	26	75.6	12	8.59	15	44.1	1	31.90	16	17.7	3	21.76	15	33.3	0
20.3	4.54	27	76.3	7	8.43	16	44.1	0	31.73	17	17.9	2	21.60	16	33.3	0
30.3	4.26	28	76.4	1	8.27	16	44.2	1	31.55	18	18.1	2	21.44	16	33.4	1
Apr. 9.2	3.98	28	76.0	4	8.11	16	44.4	2	31.38	17	18.2	1	21.28	16	33.6	2
19.2	3.72	26	75.2	8	7.96	15	44.6	2	31.23	15	18.2	0	21.13	15	33.8	2
29.2	3.49	23	74.0	12	7.84	12	44.9	3	31.10	13	18.1	1	21.00	13	34.0	2
May 9.1	3.29	20	72.3	17	7.75	9	45.3	4	31.00	10	18.0	1	20.91	9	34.3	3
19.1	3.13	16	70.2	21	7.69	6	45.8	5	30.94	6	17.8	2	20.85	6	34.6	3
29.1	3.02	11	67.8	24	7.67	2	46.3	5	30.92	2	17.6	2	20.83	2	35.0	4
June 8.1	2.96	6	65.2	26	7.70	3	46.9	6	30.94	2	17.4	2	20.85	2	35.4	4
18.0	2.95	1	62.3	29	7.76	6	47.6	7	31.01	7	17.2	2	20.91	6	35.9	5
28.0	2.99	4	59.3	30	7.86	10	48.3	7	31.12	11	17.0	2	21.01	10	36.4	5
July 8.0	3.07	8	56.3	30	7.99	13	49.0	7	31.27	15	16.9	1	21.14	13	37.0	6
18.0	3.20	13	53.2	31	8.16	17	49.8	8	31.45	18	16.7	2	21.31	17	37.5	5
27.9	3.38	18	50.2	30	8.36	20	50.5	7	31.67	22	16.6	1	21.51	20	38.1	6
Aug. 6.9	3.60	22	47.5	27	8.59	23	51.2	7	31.92	25	16.5	1	21.73	22	38.6	5
16.9	3.85	25	45.1	24	8.84	25	51.7	5	32.19	27	16.3	2	21.98	25	38.9	3
26.8	4.14	29	43.1	20	9.11	27	52.1	4	32.48	29	16.1	2	22.25	27	39.2	3
Sept. 5.8	4.46	32	41.6	15	9.39	28	52.4	3	32.79	31	15.9	2	22.53	28	39.4	2
15.8	4.80	34	40.6	10	9.68	29	52.5	1	33.11	32	15.7	2	22.83	30	39.4	0
25.8	5.15	35	40.1	5	9.98	30	52.4	1	33.44	33	15.4	3	23.14	31	39.2	2
Oct. 5.7	5.51	36	40.3	2	10.29	31	52.1	3	33.78	34	15.1	3	23.45	31	38.9	3
15.7	5.87	36	41.1	8	10.60	31	51.6	5	34.12	34	14.7	4	23.76	31	38.4	5
25.7	6.22	35	42.5	14	10.91	31	50.9	7	34.46	34	14.3	4	24.08	32	37.7	7
Nov. 4.7	6.56	34	44.4	19	11.21	30	50.0	9	34.80	34	13.9	4	24.39	31	36.9	8
14.6	6.87	31	46.9	25	11.50	29	49.0	10	35.12	32	13.5	4	24.69	30	36.0	9
24.6	7.15	28	49.7	28	11.78	28	48.0	10	35.42	30	13.2	3	24.97	28	35.1	9
Dec. 4.6	7.38	23	52.8	31	12.03	25	46.9	11	35.69	27	12.9	3	25.22	25	34.2	9
14.5	7.57	19	56.2	34	12.24	21	45.9	10	35.93	24	12.7	2	25.44	22	33.3	9
24.5	7.70	13	59.6	34	12.41	17	45.0	9	36.12	19	12.7	0	25.62	18	32.5	8
34.5	7.77	7	62.9	33	12.54	13	44.1	9	36.27	15	12.7	0	25.76	14	31.8	7
Sec δ, Tan δ	1.370		−0.936		1.015		+0.176		1.105		+0.471		1.026		+0.231	
Mean Place	4ˢ.199		66″.17		7ˢ.921		40″.35		31ˢ.125		8″.88		21ˢ.054		28″.61	
D′ψ α, Dω α	−0.02		−0.01		0.00		0.00		+0.01		+0.01		+0.01		0.00	
Dψ δ, Dω δ	−0.1		+1.0		−0.1		+1.0		−0.1		+1.0		−0.1		+1.0	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	ψ^5 **Aurigæ.** Mag. 5.3				α **Canis Majoris.** Mag. −1.6				**18 Monocerotis.** Mag. 4.7				**43 Camelop.** Mag. 5.1			
	Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination N.	
	h m 6 40		° ′ +43 39		h m 6 41		° ′ −16 35		h m 6 43		° ′ + 2 30		h m 6 44		° ′ +68 59	
	s		″		s		″		s		″		s		″	
Jan. 0.5	25.30		64.3		17.00		35.0		17.24		39.8		16.51		38.3	
10.5	25.44	14	65.6	13	17.07	7	37.4	24	17.34	10	38.5	13	16.72	21	40.9	26
20.4	25.51	7	66.9	13	17.09	2	39.5	21	17.39	5	37.4	11	16.80	8	43.5	26
30.4	25.52	1	68.3	14	17.07	2	41.4	19	17.39	0	36.5	9	16.74	6	46.0	25
Feb. 9.4	25.46	6	69.6	13	17.00	7	43.1	17	17.35	4	35.7	8	16.56	18	48.4	24
19.4	25.34	12	70.7	11	16.89	11	44.5	14	17.27	8	35.1	6	16.27	29	50.5	21
29.3	25.18	16	71.7	10	16.75	14	45.5	10	17.15	12	34.6	5	15.89	38	52.2	17
Mar. 10.3	24.98	20	72.5	8	16.58	17	46.2	7	17.00	15	34.4	2	15.45	44	53.5	13
20.3	24.76	22	73.0	5	16.40	18	46.6	4	16.84	16	34.3	1	14.96	49	54.3	8
30.3	24.53	23	73.2	2	16.22	18	46.7	1	16.68	16	34.4	1	14.45	51	54.6	3
Apr. 9.2	24.31	22	73.2	0	16.04	18	46.4	3	16.52	16	34.6	2	13.95	50	54.4	2
19.2	24.11	20	72.9	3	15.87	17	45.8	6	16.37	15	34.9	3	13.48	47	53.8	6
29.2	23.94	17	72.4	5	15.72	15	44.9	9	16.24	13	35.4	5	13.06	42	52.7	11
May 9.1	23.80	14	71.7	7	15.61	11	43.8	11	16.14	10	36.0	6	12.72	34	51.2	15
19.1	23.71	9	70.8	9	15.53	8	42.4	14	16.08	6	36.7	7	12.46	26	49.4	18
29.1	23.68	3	69.7	11	15.49	4	40.8	16	16.06	2	37.6	9	12.30	16	47.3	21
June 8.1	23.70	2	68.5	12	15.48	1	39.0	18	16.07	1	38.6	10	12.25	5	45.0	23
18.0	23.77	7	67.3	12	15.51	3	37.1	19	16.12	5	39.6	10	12.30	5	42.5	25
28.0	23.89	12	66.0	13	15.59	8	35.0	21	16.20	8	40.7	11	12.46	16	40.0	25
July 8.0	24.07	18	64.8	12	15.70	11	32.9	21	16.32	12	41.8	11	12.72	26	37.5	25
18.0	24.29	22	63.6	12	15.84	14	30.9	20	16.48	16	42.9	11	13.08	36	35.1	24
27.9	24.55	26	62.4	12	16.02	18	29.0	19	16.67	19	44.0	11	13.52	44	32.8	23
Aug. 6.9	24.85	30	61.4	10	16.23	21	27.2	18	16.88	21	45.0	10	14.04	52	30.6	22
16.9	25.18	33	60.4	10	16.46	23	25.6	16	17.11	23	45.9	9	14.63	59	28.7	19
26.8	25.53	35	59.6	8	16.71	25	24.3	13	17.36	25	46.6	7	15.29	66	27.0	17
Sept. 5.8	25.91	38	58.8	8	16.98	27	23.4	9	17.63	27	47.1	5	16.00	71	25.6	14
15.8	26.30	39	58.2	6	17.26	28	22.8	6	17.92	29	47.3	2	16.74	74	24.5	11
25.8	26.71	41	57.7	5	17.56	30	22.7	1	18.22	30	47.2	1	17.51	77	23.8	7
Oct. 5.7	27.13	42	57.3	4	17.86	30	23.0	3	18.52	30	46.9	3	18.30	79	23.4	4
15.7	27.55	42	57.1	2	18.16	30	23.7	7	18.82	30	46.3	6	19.09	79	23.4	0
25.7	27.97	42	57.1	0	18.46	30	24.9	12	19.13	31	45.5	8	19.88	79	23.7	3
Nov. 4.7	28.38	41	57.2	1	18.75	29	26.5	16	19.43	30	44.4	11	20.64	76	24.4	7
14.6	28.77	39	57.5	3	19.03	28	28.4	19	19.72	29	43.2	12	21.37	73	25.5	11
24.6	29.14	37	58.0	5	19.28	25	30.6	22	19.99	27	41.8	14	22.04	67	27.0	15
Dec. 4.6	29.47	33	58.7	7	19.51	23	33.0	24	20.23	24	40.3	15	22.63	59	28.8	18
14.5	29.76	29	59.6	9	19.70	19	35.5	25	20.44	21	38.8	15	23.14	51	30.9	21
24.5	29.99	23	60.7	11	19.85	15	38.0	25	20.61	17	37.4	14	23.54	40	33.3	24
34.5	30.17	18	61.9	12	19.95	10	40.4	24	20.74	13	36.0	14	23.82	28	35.8	25
Sec δ, Tan δ	1.382		+0.955		1.044		−0.298		1.001		+0.044		2.790		+2.604	
Mean Place	23ˢ.971		57″.55		16ˢ.216		41″.36		16ˢ.323		33″.15		13ˢ.406		31″.50	
$D'_{\psi}\alpha$, $D_{\omega}\alpha$	+0.02		+0.01		−0.01		0.00		0.00		0.00		+0.07		+0.03	
$D_{\psi}\delta$, $D_{\omega}\delta$	−0.1		+1.0		−0.1		+1.0		−0.1		+1.0		−0.1		+1.0	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	θ Geminorum. Mag. 3.6				α Pictoris. Mag. 3.3				ζ Mensæ. Mag. 5.6				τ Argûs. Mag. 2.8			
	Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination S.		Right Ascension.		Declination S.	
	h m 6 46		° ′ +34 4		h m 6 47		° ′ −61 50		h m 6 47		° ′ −80 42		h m 6 47		° ′ −50 30	
	s		″		s		″		s		″		s		″	
Jan. 0.5	60.59		12.1		19.98		40.1		31.76		69.1		46.94		26.9	
10.5	60.72	13	12.8	7	19.97	1	43.8	37	31.47	29	72.7	36	46.97	3	30.4	35
20.5	60.79	7	13.6	8	19.87	10	47.2	34	30.92	55	76.1	34	46.93	4	33.8	34
30.4	60.81	2	14.4	8	19.67	20	50.4	32	30.13	79	79.3	32	46.82	11	36.9	31
Feb. 9.4	60.77	4	15.2	8	19.40	27	53.3	29	29.12	101	82.1	28	46.65	17	39.6	27
19.4	60.68	9	16.0	8	19.06	34	55.7	24	27.94	118	84.5	24	46.43	22	41.9	23
29.3	60.55	13	16.7	7	18.66	40	57.7	20	26.61	133	86.5	20	46.17	26	43.7	18
Mar. 10.3	60.39	16	17.3	6	18.22	44	59.2	15	25.16	145	88.1	16	45.87	30	45.1	14
20.3	60.20	19	17.7	4	17.75	47	60.1	9	23.64	152	89.1	10	45.54	33	46.0	9
30.3	60.00	20	18.0	3	17.27	48	60.5	4	22.09	155	89.6	5	45.20	34	46.4	4
Apr. 9.2	59.81	19	18.1	1	16.80	47	60.4	1	20.55	154	89.6	0	44.87	33	46.3	1
19.2	59.64	17	18.0	1	16.34	46	59.8	6	19.04	151	89.1	5	44.55	32	45.6	7
29.2	59.49	15	17.7	3	15.91	43	58.6	12	17.61	143	88.0	11	44.26	29	44.4	12
May 9.2	59.37	12	17.3	4	15.53	38	57.0	16	16.29	132	86.5	15	44.01	25	42.8	16
19.1	59.30	7	16.8	5	15.20	33	55.0	20	15.10	119	84.6	19	43.80	21	40.8	20
29.1	59.27	3	16.2	6	14.93	27	52.5	25	14.08	102	82.3	23	43.63	17	38.4	24
June 8.1	59.29	2	15.5	7	14.73	20	49.7	28	13.24	84	79.6	27	43.52	11	35.7	27
18.0	59.35	6	14.8	7	14.60	13	46.6	31	12.61	63	76.6	30	43.46	6	32.8	29
28.0	59.46	11	14.1	7	14.55	5	43.4	32	12.20	41	73.5	31	43.46	0	29.7	31
July 8.0	59.61	15	13.3	8	14.57	2	40.1	33	12.02	18	70.3	32	43.52	6	26.6	31
18.0	59.80	19	12.6	7	14.67	10	36.8	33	12.07	5	67.0	33	43.63	11	23.4	32
27.9	60.02	22	12.0	6	14.85	18	33.6	32	12.36	29	63.9	31	43.79	16	20.3	31
Aug. 6.9	60.28	26	11.4	6	15.10	25	30.6	30	12.87	51	60.9	30	44.01	22	17.4	29
16.9	60.57	29	10.8	6	15.41	31	27.9	27	13.59	72	58.2	27	44.27	26	14.8	26
26.9	60.88	31	10.2	6	15.78	37	25.5	24	14.50	91	55.8	24	44.57	30	12.6	22
Sept. 5.8	61.21	33	9.6	6	16.20	42	23.6	19	15.57	107	53.9	19	44.90	33	10.9	17
15.8	61.56	35	9.1	5	16.66	46	22.3	13	16.77	120	52.6	13	45.27	37	9.7	12
25.8	61.92	36	8.6	5	17.15	49	21.6	7	18.06	129	51.8	8	45.66	39	9.1	6
Oct. 5.7	62.28	36	8.2	4	17.66	51	21.6	0	19.40	134	51.7	1	46.06	40	9.1	0
15.7	62.65	37	7.8	4	18.17	51	22.2	6	20.74	134	52.2	5	46.46	40	9.8	7
25.7	63.02	37	7.5	3	18.67	50	23.5	13	22.02	128	53.4	12	46.86	40	11.1	13
Nov. 4.7	63.39	37	7.3	2	19.14	47	25.4	19	23.20	118	55.2	18	47.24	38	13.0	19
14.6	63.74	35	7.2	1	19.57	43	27.8	24	24.24	104	57.5	23	47.59	35	15.4	24
24.6	64.07	33	7.2	0	19.94	37	30.7	29	25.10	86	60.3	28	47.90	31	18.3	29
Dec. 4.6	64.38	31	7.3	1	20.24	30	34.0	33	25.74	64	63.4	31	48.16	26	21.5	32
14.6	64.65	27	7.6	3	20.47	23	37.6	36	26.13	39	66.8	34	48.37	21	24.9	34
24.5	64.87	22	8.0	4	20.61	14	41.3	37	26.27	14	70.4	36	48.52	15	28.5	36
34.5	65.04	17	8.6	6	20.65	4	45.0	37	26.14	13	74.1	37	48.59	7	32.1	36
Sec δ, Tan δ	1.207		+0.676		2.119		−1.868		6.201		−6.120		1.572		−1.213	
Mean Place	59ˢ.454		5″.75		17ˢ.387		48″.55		23ˢ.250		78″.08		45ˢ.143		35″.03	
D′ψ α, Dω α	+0.02		+0.01		−0.05		−0.03		−0.16		−0.08		−0.03		−0.02	
Dψ δ, Dω δ	−0.1		+1.0		−0.1		+1.0		−0.1		+1.0		−0.1		+1.0	

Mean Solar Date.	**15 Lyncis.** Mag. 4.5				**θ Canis Majoris.** Mag. 4.2				**ε Canis Majoris.** Mag. 1.6				**ζ Geminorum.** Var. 3.7–4.3			
	Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination S.		Right Ascension.		Declination N.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	6 49		+58 32		6 50		−11 55		6 55		−28 50		6 58		+20 42	
	s		″		s		″		s		″		s		″	
Jan. 0.5	41.79		27.7		7.07		32.4		11.16		58.3		54.42		6.7	
10.5	41.97	18	29.8	21	7.16	9	34.5	21	11.24	8	61.2	29	54.55	13	6.5	2
20.5	42.06	9	31.9	21	7.20	4	36.4	19	11.27	3	64.0	28	54.63	8	6.5	0
30.4	42.06	0	34.0	21	7.20	0	38.1	17	11.25	2	66.5	25	54.66	3	6.5	0
Feb. 9.4	41.97	9	36.0	20	7.15	5	39.6	15	11.17	8	68.7	22	54.64	2	6.7	2
19.4	41.80	17	37.7	17	7.06	9	40.9	13	11.05	12	70.5	18	54.57	7	6.9	2
29.3	41.56	24	39.2	15	6.93	13	41.8	9	10.89	16	72.0	15	54.46	11	7.1	2
Mar. 10.3	41.28	28	40.4	12	6.78	15	42.4	6	10.70	19	73.1	11	54.32	14	7.4	3
20.3	40.96	32	41.2	8	6.61	17	42.8	4	10.50	20	73.8	7	54.16	16	7.7	3
30.3	40.63	33	41.6	4	6.43	18	42.9	1	10.29	21	74.1	3	53.99	17	7.9	2
Apr. 9.2	40.30	33	41.5	1	6.25	18	42.7	2	10.08	21	73.9	2	53.82	17	8.1	2
19.2	39.99	31	41.1	4	6.09	16	42.2	5	9.88	20	73.4	5	53.66	16	8.2	1
29.2	39.72	27	40.3	8	5.95	14	41.5	7	9.70	18	72.5	9	53.52	14	8.3	1
May 9.2	39.50	22	39.1	12	5.84	11	40.5	10	9.55	15	71.2	13	53.42	10	8.4	1
19.1	39.35	15	37.7	14	5.76	8	39.3	12	9.43	12	69.6	16	53.35	7	8.4	0
29.1	39.26	9	36.0	17	5.71	5	37.9	14	9.35	8	67.7	19	53.32	3	8.4	0
June 8.1	39.24	2	34.1	19	5.70	1	36.3	16	9.31	4	65.5	22	53.33	1	8.4	0
18.0	39.29	5	32.1	20	5.73	3	34.6	17	9.31	0	63.1	24	53.38	5	8.5	1
28.0	39.42	13	30.1	20	5.80	7	32.8	18	9.35	4	60.6	25	53.47	9	8.5	0
July 8.0	39.62	20	28.0	21	5.90	10	30.9	19	9.43	8	58.1	25	53.59	12	8.5	0
18.0	39.88	26	26.0	20	6.04	14	29.0	19	9.55	12	55.5	26	53.75	16	8.6	1
27.9	40.20	32	24.1	19	6.21	17	27.2	18	9.70	15	53.0	25	53.94	19	8.6	0
Aug. 6.9	40.58	38	22.3	18	6.41	20	25.5	17	9.89	19	50.7	23	54.16	22	8.6	0
16.9	41.01	43	20.7	16	6.63	22	24.1	14	10.11	22	48.6	21	54.40	24	8.5	1
26.9	41.47	46	19.2	15	6.87	24	22.9	12	10.36	25	46.8	18	54.67	27	8.4	1
Sept. 5.8	41.96	49	18.0	12	7.13	26	22.0	9	10.63	27	45.4	14	54.96	29	8.2	2
15.8	42.48	52	17.0	10	7.41	28	21.4	6	10.92	29	44.5	9	55.26	30	7.9	3
25.8	43.02	54	16.2	8	7.70	29	21.2	2	11.23	31	44.1	4	55.57	31	7.5	4
Oct. 5.7	43.58	56	15.7	5	8.00	30	21.5	3	11.55	32	44.2	1	55.89	32	7.0	5
15.7	44.15	57	15.5	2	8.30	30	22.2	7	11.87	32	44.8	6	56.22	33	6.4	6
25.7	44.71	56	15.6	1	8.60	30	23.2	10	12.19	32	46.0	12	56.56	34	5.8	6
Nov. 4.7	45.26	55	16.0	4	8.90	30	24.6	14	12.50	31	47.7	17	56.89	33	5.1	7
14.6	45.79	53	16.7	7	9.19	29	26.4	18	12.80	30	49.8	21	57.21	32	4.4	7
24.6	46.28	49	17.7	10	9.45	26	28.4	20	13.08	28	52.3	25	57.52	31	3.7	7
Dec. 4.6	46.72	44	19.0	13	9.69	24	30.5	21	13.32	24	55.0	27	57.80	28	3.1	6
14.6	47.10	38	20.6	16	9.90	21	32.7	22	13.53	21	57.9	29	58.05	25	2.6	5
24.5	47.42	32	22.4	18	10.07	17	35.0	23	13.69	16	60.9	30	58.26	21	2.2	4
34.5	47.66	24	24.4	20	10.19	12	37.2	22	13.80	11	63.9	30	58.42	16	1.9	3
Sec δ, Tan δ	1.916		+1.635		1.022		−0.211		1.142		−0.551		1.069		+0.378	
Mean Place	39ˢ.768		21″.44		6ˢ.108		39″.42		10ˢ.030		66″.17		53ˢ.444		0″.62	
$D'_\psi\alpha$, $D_\omega\alpha$	+0.04		+0.03		−0.01		0.00		−0.01		−0.01		+0.01		+0.01	
$D_\psi\delta$, $D_\omega\delta$	−0.1		+1.0		−0.1		+1.0		−0.1		+1.0		−0.1		+1.0	

FOR THE UPPER TRANSIT AT WASHINGTON

Mean Solar Date.	o^2 Canis Majoris. Mag. 3.1				γ Canis Majoris. Mag. 4.1				δ Canis Majoris. Mag. 2.0				63 Aurigæ. Mag. 5.1			
	Right Ascension.	Diff.	Declination S.	Diff.	Right Ascension.	Diff.	Declination S.	Diff.	Right Ascension.	Diff.	Declination S.	Diff.	Right Ascension.	Diff.	Declination N.	Diff.
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	6 59		−23 41		6 59		−15 29		7 4		−26 14		7 5		+39 27	
	s		″		s		″		s		″		s		″	
Jan. 0.5	22.05		66.8		47.62		61.9		49.82		62.3		37.59		59.4	
10.5	22.14	9	69.5	27	47.72	10	64.2	23	49.91	9	65.1	28	37.75	16	60.4	10
20.5	22.18	4	72.1	26	47.77	5	66.4	22	49.95	4	67.7	26	37.85	10	61.5	11
30.4	22.17	1	74.4	23	47.77	0	68.3	19	49.94	1	70.1	24	37.89	4	62.6	11
Feb. 9.4	22.11	6	76.4	20	47.72	5	70.0	17	49.88	6	72.3	22	37.87	2	63.8	12
19.4	22.00	11	78.1	17	47.63	9	71.4	14	49.77	11	74.2	19	37.79	8	64.9	11
29.4	21.86	14	79.5	14	47.50	13	72.5	11	49.63	14	75.7	15	37.66	13	65.9	10
Mar. 10.3	21.69	17	80.5	10	47.35	15	73.3	8	49.46	17	76.8	11	37.49	17	66.7	8
20.3	21.50	19	81.1	6	47.18	17	73.8	5	49.27	19	77.5	7	37.29	20	67.4	7
30.3	21.30	20	81.4	3	47.00	18	74.0	2	49.07	20	77.8	3	37.08	21	67.9	5
Apr. 9.2	21.11	19	81.3	1	46.82	18	73.9	1	48.86	21	77.7	1	36.88	20	68.1	2
19.2	20.92	19	80.8	5	46.65	17	73.4	5	48.66	20	77.3	4	36.68	20	68.0	1
29.2	20.75	17	79.9	9	46.50	15	72.7	7	48.49	17	76.5	8	36.51	17	67.7	3
May 9.2	20.61	14	78.8	11	46.38	12	71.7	10	48.34	15	75.4	11	36.37	14	67.2	5
19.1	20.50	11	77.3	15	46.29	9	70.4	13	48.22	12	73.9	15	36.27	10	66.5	7
29.1	20.43	7	75.6	17	46.23	6	68.9	15	48.14	8	72.1	18	36.22	5	65.7	8
June 8.1	20.40	3	73.6	20	46.21	2	67.2	17	48.10	4	70.1	20	36.22	0	64.8	9
18.1	20.41	1	71.4	22	46.23	2	65.4	18	48.10	0	67.9	22	36.26	4	63.8	10
28.0	20.45	4	69.1	23	46.28	5	63.4	20	48.14	4	65.5	24	36.35	9	62.7	11
July 8.0	20.53	8	66.7	24	46.37	9	61.4	20	48.21	7	63.0	25	36.48	13	61.7	10
18.0	20.65	12	64.4	23	46.50	13	59.4	20	48.32	11	60.6	24	36.66	18	60.6	11
27.9	20.81	16	62.1	23	46.66	16	57.5	19	48.47	15	58.2	24	36.88	22	59.5	11
Aug. 6.9	21.00	19	59.9	22	46.85	19	55.7	18	48.65	18	56.0	22	37.14	26	58.5	10
16.9	21.21	21	58.0	19	47.06	21	54.1	16	48.86	21	54.0	20	37.43	29	57.5	10
26.9	21.45	24	56.4	16	47.30	24	52.7	14	49.10	24	52.3	17	37.74	31	56.6	9
Sept. 5.8	21.71	26	55.2	12	47.56	26	51.7	10	49.36	26	50.9	14	38.08	34	55.7	9
15.8	21.99	28	54.4	8	47.83	27	51.1	6	49.64	28	50.0	9	38.44	36	54.9	8
25.8	22.29	30	54.0	4	48.12	29	50.9	2	49.94	30	49.6	4	38.81	37	54.1	8
Oct. 5.8	22.60	31	54.1	1	48.42	30	51.1	2	50.25	31	49.7	1	39.20	39	53.4	7
15.7	22.92	32	54.8	7	48.73	31	51.7	6	50.57	32	50.3	6	39.60	40	52.9	5
25.7	23.23	31	55.9	11	49.03	30	52.8	11	50.89	32	51.4	11	40.00	40	52.5	4
Nov. 4.7	23.54	31	57.5	16	49.33	30	54.2	14	51.20	31	53.0	16	40.40	40	52.2	3
14.6	23.83	29	59.5	20	49.62	29	56.0	18	51.50	30	55.0	20	40.78	38	52.1	1
24.6	24.11	28	61.8	23	49.89	27	58.1	21	51.78	28	57.4	24	41.15	37	52.1	0
Dec. 4.6	24.36	25	64.4	26	50.14	25	60.4	23	52.03	25	60.1	27	41.49	34	52.3	2
14.6	24.57	21	67.1	27	50.36	22	62.8	24	52.25	22	62.9	28	41.79	30	52.8	5
24.5	24.74	17	69.9	28	50.53	17	65.3	25	52.42	17	65.8	29	42.05	26	53.5	7
34.5	24.86	12	72.7	28	50.66	13	67.7	24	52.55	13	68.7	29	42.25	20	54.4	9
Sec δ, Tan δ	1.092		−0.439		1.038		−0.277		1.115		−0.493		1.295		+0.823	
Mean Place	$20^{s}.996$		$74''.60$		$46^{s}.646$		$69''.34$		$48^{s}.740$		$70''.38$		$36^{s}.325$		$54''.08$	
$D'_{\psi}\alpha$, $D_{\omega}\alpha$	−0.01		−0.01		−0.01		0.00		−0.01		−0.01		+0.02		+0.02	
$D_{\psi}\delta$, $D_{\omega}\delta$	−0.1		+1.0		−0.1		+1.0		−0.1		+1.0		−0.1		+1.0	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	**51 Geminorum.** Mag. 5.3				**γ^2 Volantis.** Mag. 3.9				**25 H. Camelop.** Mag. 5.1				**λ Geminorum.** Mag. 3.6			
	Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination N.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	7 8		+16 18		7 9		−70 20		7 12		+82 34		7 13		+16 41	
	s		″		s		″		s		″		s		″	
Jan. 0.5	20.12		38.7		33.43		71.6		47.91		66.5		3.17		65.4	
10.5	20.26	14	38.2	5	33.42	1	75.3	37	48.49	58	69.5	30	3.31	14	64.9	5
20.5	20.35	9	37.8	4	33.28	14	78.9	36	48.73	24	72.6	31	3.40	9	64.6	3
30.4	20.38	3	37.6	2	33.02	26	82.3	34	48.62	11	75.6	30	3.44	4	64.4	2
Feb. 9.4	20.37	1	37.5	1	32.65	37	85.4	31	48.18	44	78.5	29	3.43	1	64.3	1
19.4	20.31	6	37.5	0	32.18	47	88.2	28	47.43	75	81.1	26	3.38	5	64.3	0
29.4	20.21	10	37.6	1	31.63	55	90.5	23	46.40	103	83.3	22	3.28	10	64.4	1
Mar. 10.3	20.07	14	37.8	2	31.01	62	92.4	19	45.16	124	85.1	18	3.15	13	64.6	2
20.3	19.91	16	38.0	2	30.34	67	93.7	13	43.76	140	86.4	13	3.00	15	64.8	2
30.3	19.75	16	38.2	2	29.65	69	94.5	8	42.27	149	87.1	7	2.84	16	65.0	2
Apr. 9.3	19.59	16	38.4	2	28.96	69	94.8	3	40.76	151	87.2	1	2.68	16	65.2	2
19.2	19.44	15	38.6	2	28.28	68	94.6	2	39.29	147	86.8	4	2.52	16	65.4	2
29.2	19.30	14	38.8	2	27.63	65	93.8	8	37.92	137	85.8	10	2.38	14	65.6	2
May 9.2	19.19	11	39.0	2	27.02	61	92.5	13	36.70	122	84.3	15	2.27	11	65.8	2
19.1	19.12	7	39.2	2	26.48	54	90.8	17	35.69	101	82.3	20	2.19	8	66.0	2
29.1	19.08	4	39.4	2	26.01	47	88.6	22	34.91	78	80.0	23	2.15	4	66.2	2
June 8.1	19.08	0	39.6	2	25.63	38	86.1	25	34.40	51	77.4	26	2.14	1	66.5	3
18.1	19.12	4	39.9	3	25.34	29	83.2	29	34.16	24	74.5	29	2.17	3	66.7	2
28.0	19.19	7	40.1	2	25.16	18	80.1	31	34.21	5	71.5	30	2.24	7	66.9	2
July 8.0	19.30	11	40.4	3	25.08	8	76.9	32	34.54	33	68.4	31	2.35	11	67.1	2
18.0	19.45	15	40.7	3	25.11	3	73.6	33	35.15	61	65.4	30	2.49	14	67.3	2
27.9	19.63	18	40.9	2	25.25	14	70.3	33	36.02	87	62.4	30	2.66	17	67.5	2
Aug. 6.9	19.83	20	41.1	2	25.49	24	67.2	31	37.14	112	59.6	28	2.86	20	67.7	2
16.9	20.06	23	41.2	1	25.84	35	64.3	29	38.49	135	57.0	26	3.09	23	67.8	1
26.9	20.32	26	41.2	0	26.28	44	61.8	25	40.04	155	54.7	23	3.34	25	67.7	1
Sept. 5.8	20.60	28	41.1	1	26.80	52	59.7	21	41.76	172	52.7	20	3.61	27	67.6	1
15.8	20.89	29	40.9	2	27.39	59	58.1	16	43.62	186	51.0	17	3.90	29	67.3	3
25.8	21.19	30	40.5	4	28.03	64	57.1	10	45.59	197	49.7	13	4.21	31	66.9	4
Oct. 5.8	21.50	31	40.0	5	28.70	67	56.8	3	47.64	205	48.9	8	4.52	31	66.4	5
15.7	21.82	32	39.3	7	29.38	68	57.1	3	49.73	209	48.5	4	4.84	32	65.7	7
25.7	22.15	33	38.6	7	30.06	68	58.1	10	51.82	209	48.6	1	5.17	33	64.9	8
Nov. 4.7	22.47	32	37.7	9	30.71	65	59.7	16	53.86	204	49.1	5	5.50	33	64.0	9
14.6	22.79	32	36.8	9	31.30	59	61.9	22	55.81	195	50.1	10	5.82	32	63.1	9
24.6	23.09	30	35.9	9	31.82	52	64.6	27	57.62	181	51.6	15	6.12	30	62.1	10
Dec. 4.6	23.37	28	35.0	9	32.25	43	67.8	32	59.24	162	53.6	20	6.41	29	61.2	9
14.6	23.62	25	34.1	9	32.57	32	71.3	35	60.62	138	55.9	23	6.66	25	60.4	8
24.5	23.84	22	33.4	7	32.77	20	74.9	36	61.73	111	58.5	26	6.88	22	59.6	8
34.5	24.00	16	32.8	6	32.84	7	78.7	38	62.53	80	61.4	29	7.06	18	59.0	6
Sec δ, Tan δ	1.042		+0.293		2.974		−2.801		7.750		+7.685		1.044		+0.300	
Mean Place	19ˢ.177		32″.68		29ˢ.785		82″.16		38ˢ.154		61″.82		2ˢ.220		59″.49	
D′ψ α, Dω α	+0.01		+0.01		−0.07		−0.06		+0.19		+0.16		+0.01		+0.01	
Dψ δ, Dω δ	−0.1		+1.0		−0.1		+1.0		−0.1		+1.0		−0.1		+0.9	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	π Argûs. Mag. 2.7				δ Geminorum. Mag. 3.5				δ Volantis. Mag. 4.0				ι Geminorum. Mag. 3.9			
	Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination N.	
	h m 7 14		° ′ −36 55		h m 7 14		° ′ +22 8		h m 7 16		° ′ −67 47		h m 7 20		° ′ +27 58	
	s		″		s		″		s		″		s		″	
Jan. 0.5	3.34		71.9		53.14		48.2		56.19		35.2		16.85		30.8	
10.5	3.43	9	75.1	32	53.29	15	48.1	1	56.22	3	39.0	38	17.01	16	31.0	2
20.5	3.46	3	78.2	31	53.39	10	48.1	0	56.13	9	42.6	36	17.12	11	31.3	3
30.4	3.44	2	81.1	29	53.44	5	48.2	1	55.93	20	46.1	35	17.17	5	31.8	5
Feb. 9.4	3.36	8	83.7	26	53.43	1	48.4	2	55.63	30	49.3	32	17.17	0	32.3	5
19.4	3.23	13	86.0	23	53.37	6	48.7	3	55.23	40	52.1	28	17.11	6	32.9	6
29.4	3.06	17	87.9	19	53.27	10	49.1	4	54.76	47	54.5	24	17.01	10	33.5	6
Mar. 10.3	2.86	20	89.3	14	53.14	13	49.4	3	54.23	53	56.5	20	16.87	14	34.1	6
20.3	2.63	23	90.3	10	52.99	15	49.8	4	53.66	57	57.9	14	16.71	16	34.6	5
30.3	2.39	24	90.9	6	52.82	17	50.1	3	53.06	60	58.8	9	16.54	17	35.0	4
Apr. 9.3	2.15	24	91.0	1	52.65	17	50.3	2	52.45	61	59.2	4	16.36	18	35.2	2
19.2	1.92	23	90.6	4	52.49	16	50.5	2	51.85	60	59.1	1	16.19	17	35.4	2
29.2	1.70	22	89.8	8	52.35	14	50.6	1	51.27	58	58.4	7	16.04	15	35.4	0
May 9.2	1.51	19	88.6	12	52.23	12	50.7	1	50.74	53	57.2	12	15.92	12	35.3	1
19.1	1.36	15	87.0	16	52.15	8	50.7	0	50.26	48	55.6	16	15.83	9	35.1	2
29.1	1.24	12	85.1	19	52.11	4	50.6	1	49.85	41	53.5	21	15.78	5	34.9	2
June 8.1	1.16	8	82.9	22	52.10	1	50.6	0	49.51	34	51.0	25	15.76	2	34.6	3
18.1	1.12	4	80.4	25	52.13	3	50.5	1	49.26	25	48.2	28	15.79	3	34.2	4
28.0	1.13	1	77.7	27	52.21	8	50.4	1	49.09	17	45.1	31	15.86	7	33.8	4
July 8.0	1.18	5	74.9	28	52.32	11	50.3	1	49.02	7	41.9	32	15.97	11	33.3	5
18.0	1.27	9	72.1	28	52.46	14	50.2	1	49.04	2	38.6	33	16.12	15	32.8	5
28.0	1.40	13	69.4	27	52.64	18	50.1	1	49.16	12	35.4	32	16.30	18	32.3	5
Aug. 6.9	1.58	18	66.8	26	52.85	21	49.9	2	49.38	22	32.2	32	16.51	21	31.8	5
16.9	1.79	21	64.4	24	53.08	23	49.7	2	49.68	30	29.3	29	16.75	24	31.3	5
26.9	2.03	24	62.4	20	53.34	26	49.4	3	50.07	39	26.8	25	17.01	26	30.7	6
Sept. 5.8	2.30	27	60.7	17	53.62	28	49.0	4	50.53	46	24.6	22	17.30	29	30.1	6
15.8	2.60	30	59.5	12	53.92	30	48.6	4	51.05	52	23.0	16	17.61	31	29.4	7
25.8	2.92	32	58.9	6	54.23	31	48.1	5	51.62	57	21.9	11	17.94	33	28.7	7
Oct. 5.8	3.25	33	58.8	1	54.55	32	47.5	6	52.23	61	21.5	4	18.28	34	28.0	7
15.7	3.59	34	59.3	5	54.89	34	46.8	7	52.85	62	21.8	3	18.63	35	27.3	7
25.7	3.94	35	60.4	11	55.23	34	46.0	8	53.47	62	22.7	9	18.98	35	26.5	8
Nov. 4.7	4.28	34	62.0	16	55.57	34	45.3	7	54.06	59	24.2	15	19.34	36	25.8	7
14.7	4.60	32	64.2	22	55.90	33	44.5	8	54.61	55	26.4	22	19.69	35	25.2	6
24.6	4.90	30	66.8	26	56.22	32	43.8	7	55.10	49	29.1	27	20.03	34	24.7	5
Dec. 4.6	5.17	27	69.7	29	56.52	30	43.1	7	55.51	41	32.2	31	20.34	31	24.2	5
14.6	5.40	23	72.8	31	56.78	26	42.6	5	55.83	32	35.6	34	20.62	28	24.0	2
24.5	5.58	18	76.0	32	57.00	22	42.2	4	56.04	21	39.3	37	20.86	24	23.9	1
34.5	5.71	13	79.3	33	57.19	19	41.9	3	56.14	10	43.1	38	21.06	20	23.9	0
Sec δ, Tan δ	1.251		−0.752		1.080		+0.407		2.646		−2.450		1.132		+0.531	
Mean Place	$2^{s}.086$		81″.05		$52^{s}.153$		42″.65		$53^{s}.055$		46″.31		$15^{s}.786$		25″.69	
$D'_{\psi}\,\alpha$, $D_{\omega}\,\alpha$	−0.02		−0.02		+0.01		+0.01		−0.06		−0.05		+0.01		+0.01	
$D_{\psi}\,\delta$, $D_{\omega}\,\delta$	−0.1		+0.9		−0.1		+0.9		−0.1		+0.9		−0.1		+0.9	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	η Canis Majoris. Mag. 2.4				Groombridge. 1308. Mag. 5.8				β Canis Minoris. Mag. 3.1				ρ Geminorum. Mag. 4.2			
	Right Ascension.	Δ	Declination S.	Δ	Right Ascension.	Δ	Declination N.	Δ	Right Ascension.	Δ	Declination N.	Δ	Right Ascension.	Δ	Declination N.	Δ
	h m 7 20		° ′ −29 7		h m 7 21		° ′ +68 38		h m 7 22		° ′ + 8 28		h m 7 23		° ′ +31 57	
	s		″		s		″		s		″		s		″	
Jan. 0.5	37.98		42.1		47.33		52.0		23.67		8.8		28.32		42.5	
10.5	38.09	11	45.1	30	47.63	30	54.5	25	23.81	14	7.7	11	28.49	17	43.0	5
20.5	38.15	6	47.9	28	47.80	17	57.0	25	23.91	10	6.8	9	28.61	12	43.5	5
30.4	38.15	0	50.5	26	47.85	5	59.6	26	23.96	5	6.1	7	28.67	6	44.2	7
Feb. 9.4	38.10	5	52.9	24	47.76	9	62.1	25	23.95	1	5.5	6	28.67	0	45.0	8
19.4	38.00	10	55.0	21	47.56	20	64.4	23	23.90	5	5.1	4	28.61	6	45.8	8
29.4	37.86	14	56.7	17	47.26	30	66.5	21	23.81	9	4.9	2	28.51	10	46.6	8
Mar. 10.3	37.69	17	58.0	13	46.88	38	68.2	17	23.69	12	4.8	1	28.37	14	47.4	8
20.3	37.49	20	59.0	10	46.43	45	69.4	12	23.54	15	4.8	0	28.20	17	48.0	6
30.3	37.28	21	59.5	5	45.95	48	70.2	8	23.38	16	4.9	1	28.02	18	48.4	4
Apr. 9.3	37.08	20	59.6	1	45.45	50	70.5	3	23.22	16	5.1	2	27.84	18	48.7	3
19.2	36.88	20	59.3	3	44.97	48	70.3	2	23.07	15	5.4	3	27.66	18	48.9	2
29.2	36.69	19	58.6	7	44.53	44	69.6	7	22.94	13	5.7	3	27.50	16	48.9	0
May 9.2	36.52	17	57.5	11	44.14	39	68.5	11	22.83	11	6.1	4	27.37	13	48.7	2
19.1	36.39	13	56.1	14	43.82	32	67.0	15	22.74	9	6.6	5	27.27	10	48.4	3
29.1	36.29	10	54.3	18	43.59	23	65.1	19	22.69	5	7.1	5	27.21	6	48.0	4
June 8.1	36.23	6	52.3	20	43.46	13	63.0	21	22.67	2	7.7	6	27.19	2	47.5	5
18.1	36.21	2	50.1	22	43.42	4	60.7	23	22.69	2	8.3	6	27.22	3	46.9	6
28.0	36.23	2	47.7	24	43.48	6	58.2	25	22.75	6	9.0	7	27.29	7	46.3	6
July 8.0	36.28	5	45.2	25	43.64	16	55.6	26	22.84	9	9.7	7	27.40	11	45.6	7
18.0	36.37	9	42.7	25	43.89	25	53.0	26	22.97	13	10.4	7	27.55	15	44.9	7
28.0	36.50	13	40.2	25	44.24	35	50.4	26	23.13	16	11.0	6	27.73	18	44.1	8
Aug. 6.9	36.66	16	37.9	23	44.67	43	48.0	24	23.31	18	11.6	6	27.95	22	43.4	7
16.9	36.86	20	35.8	21	45.18	51	45.7	23	23.52	21	12.0	4	28.20	25	42.6	8
26.9	37.09	23	33.9	19	45.75	57	43.6	21	23.75	23	12.3	3	28.47	27	41.8	8
Sept. 5.8	37.35	26	32.4	15	46.38	63	41.7	19	24.00	25	12.4	1	28.77	30	41.0	8
15.8	37.63	28	31.4	10	47.07	69	40.1	16	24.27	27	12.3	1	29.09	32	40.2	8
25.8	37.93	30	30.9	5	47.80	73	38.7	14	24.56	29	12.0	3	29.43	34	39.5	7
Oct. 5.8	38.24	31	30.9	0	48.56	76	37.7	10	24.86	30	11.5	5	29.78	35	38.7	8
15.7	38.56	32	31.4	5	49.34	78	37.1	6	25.17	31	10.8	7	30.14	36	37.9	8
25.7	38.89	33	32.4	10	50.13	79	36.9	2	25.49	32	9.9	9	30.51	37	37.2	7
Nov. 4.7	39.21	32	34.0	16	50.91	78	37.0	1	25.81	32	8.8	11	30.88	37	36.6	6
14.7	39.52	31	36.0	20	51.66	75	37.5	5	26.12	31	7.6	12	31.24	36	36.1	5
24.6	39.82	30	38.4	24	52.37	71	38.5	10	26.42	30	6.3	13	31.59	35	35.7	4
Dec. 4.6	40.09	27	41.1	27	53.03	66	39.9	14	26.70	28	5.0	13	31.92	33	35.4	3
14.6	40.32	23	44.0	29	53.61	58	41.6	17	26.95	25	3.7	13	32.22	30	35.4	0
24.5	40.51	19	47.0	30	54.09	48	43.6	20	27.16	21	2.4	13	32.47	25	35.5	1
34.5	40.65	14	50.1	31	54.46	37	45.9	23	27.34	18	1.3	11	32.68	21	35.8	3
Sec δ, Tan δ	1.145		−0.557		2.747		+2.558		1.011		+0.149		1.179		+0.624	
Mean Place	36^{s}.902		51″.07		44^{s}.134		48″.21		22^{s}.772		2″.47		27^{s}.199		37″.78	
$D'_{\psi}\alpha$, $D_{\omega}\alpha$	−0.01		−0.01		+0.06		+0.06		0.00		0.00		+0.02		+0.01	
$D_{\psi}\delta$, $D_{\omega}\delta$	−0.1		+0.9		−0.1		+0.9		−0.1		+0.9		−0.1		+0.9	

Mean Solar Date.	σ Argûs. Mag. 3.3				α² Geminorum. Mag. 2.0				25 Monocerotis. Mag. 5.2				α Canis Minoris. Mag. 0.5			
	Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination N.	
	h m 7 26		° ′ −43 6		h m 7 28		° ′ +32 4		h m 7 32		° ′ − 3 54		h m 7 34		° + 5 2	
	s		″		s		″		s		″		s		″	
Jan. 0.5	27.66		71.8		60.36		62.0		55.03		42.3		42.60		69.4	
10.5	27.76	10	75.2	34	60.54	18	62.4	4	55.17	14	44.1	18	42.75	15	68.1	
20.5	27.80	4	78.6	34	60.66	12	63.0	6	55.26	9	45.8	17	42.85	10	67.0	
30.5	27.77	3	81.7	31	60.72	6	63.7	7	55.30	4	47.3	15	42.90	5	66.1	
Feb. 9.4	27.68	9	84.6	29	60.72	0	64.5	8	55.30	0	48.5	12	42.90	0	65.4	
19.4	27.54	14	87.1	25	60.67	5	65.3	8	55.25	5	49.5	10	42.86	4	64.8	
29.4	27.36	18	89.2	21	60.57	10	66.1	8	55.16	9	50.3	8	42.77	9	64.4	
Mar. 10.3	27.14	22	90.9	17	60.44	13	66.8	7	55.04	12	50.9	6	42.65	12	64.2	
20.3	26.89	25	92.2	13	60.28	16	67.4	6	54.90	14	51.3	4	42.51	14	64.1	
30.3	26.62	27	93.0	8	60.10	18	67.9	5	54.74	16	51.4	1	42.36	15	64.1	
Apr. 9.3	26.35	27	93.3	3	59.91	19	68.3	4	54.58	16	51.3	1	42.20	16	64.2	
19.2	26.08	27	93.1	2	59.73	18	68.5	2	54.42	16	51.0	3	42.04	16	64.5	
29.2	25.83	25	92.4	7	59.57	16	68.5	0	54.28	14	50.5	5	41.90	14	64.9	
May 9.2	25.61	22	91.3	11	59.44	13	68.3	2	54.16	12	49.9	6	41.78	12	65.3	
19.2	25.42	19	89.8	15	59.34	10	68.0	3	54.06	10	49.1	8	41.69	9	65.8	
29.1	25.26	16	87.9	19	59.27	7	67.6	4	54.00	6	48.1	10	41.63	6	66.4	
June 8.1	25.15	11	85.6	23	59.25	2	67.1	5	53.97	3	47.0	11	41.61	2	67.1	7
18.1	25.08	7	83.1	25	59.27	2	66.5	6	53.97	0	45.8	12	41.62	1	67.8	7
28.0	25.05	3	80.3	28	59.33	6	65.8	7	54.01	4	44.5	13	41.67	5	68.6	
July 8.0	25.07	2	77.4	29	59.44	11	65.1	7	54.08	7	43.2	13	41.75	8	69.4	
18.0	25.14	7	74.5	29	59.58	14	64.4	7	54.19	11	41.9	13	41.86	11	70.2	
28.0	25.26	12	71.6	29	59.76	18	63.6	8	54.33	14	40.6	13	42.00	14	70.9	7
Aug. 6.9	25.42	16	68.8	28	59.97	21	62.8	8	54.49	16	39.4	12	42.17	17	71.5	6
16.9	25.62	20	66.2	26	60.21	24	62.0	8	54.68	19	38.4	10	42.37	20	72.0	5
26.9	25.86	24	64.0	22	60.48	27	61.2	8	54.89	21	37.6	8	42.59	22	72.4	4
Sept. 5.9	26.14	28	62.1	19	60.77	29	60.4	8	55.13	24	37.0	6	42.83	24	72.6	2
15.8	26.45	31	60.7	14	61.09	32	59.5	9	55.39	26	36.7	3	43.09	26	72.6	0
25.8	26.78	33	59.8	9	61.42	33	58.6	9	55.67	28	36.7	0	43.37	28	72.3	3
Oct. 5.8	27.13	35	59.6	2	61.77	35	57.8	8	55.96	29	37.0	3	43.67	30	71.7	6
15.7	27.50	37	60.0	4	62.13	36	57.0	8	56.26	30	37.7	7	43.98	31	70.9	8
25.7	27.87	37	60.9	9	62.50	37	56.2	8	56.57	31	38.7	10	44.29	31	69.9	10
Nov. 4.7	28.23	36	62.5	16	62.87	37	55.5	7	56.88	31	40.0	13	44.60	31	68.7	12
14.7	28.58	35	64.6	21	63.24	37	54.9	6	57.18	30	41.5	15	44.91	31	67.3	14
24.6	28.91	33	67.2	26	63.59	35	54.5	4	57.48	30	43.2	17	45.21	30	65.8	15
Dec. 4.6	29.20	29	70.2	30	63.92	33	54.2	3	57.76	28	45.1	19	45.49	28	64.3	15
14.6	29.45	25	73.5	33	64.22	30	54.1	1	58.01	25	47.1	20	45.75	26	62.7	16
24.6	29.65	20	76.9	34	64.48	26	54.2	1	58.22	21	49.0	19	45.97	22	61.2	15
34.5	29.79	14	80.4	35	64.69	21	54.5	3	58.39	17	51.0	20	46.14	17	59.8	14
Sec δ, Tan δ	1.370		−0.936		1.180		+0.627		1.002		−0.068		1.005		+0.095	
Mean Place	26ˢ.291		82″.04		59ˢ.236		57″.49		54ˢ.154		49″.49		41ˢ.765		63″.85	
D′ψ α, Dω α	−0.02		−0.02		+0.02		+0.02		0.00		0.00		0.00		0.00	
Dψ δ, Dω δ	−0.1		+0.9		−0.2		+0.9		−0.2		+0.9		−0.2		+0.9	

Mean Solar Date.	24 Lyncis. Mag. 5.0 Right Ascension.		24 Lyncis. Mag. 5.0 Declination N.		κ Geminorum. Mag. 3.7 Right Ascension.		κ Geminorum. Mag. 3.7 Declination N.		β Geminorum. Mag. 1.2 Right Ascension.		β Geminorum. Mag. 1.2 Declination N.		4 Puppis. Mag. 5.1 Right Ascension.		4 Puppis. Mag. 5.1 Declination S.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	7 35		+58 54		7 39		+24 36		7 39		+28 14		7 41		−14 20	
	s		″		s		″		s		″		s		″	
Jan. 0.5	36.25		65.3		9.25		39.6		57.04		26.6		54.63		49.2	
10.5	36.51	26	67.2	19	9.43	18	39.5	1	57.23	19	26.7	1	54.77	14	51.5	23
20.5	36.69	18	69.3	21	9.56	13	39.6	1	57.36	13	27.0	3	54.87	10	53.8	23
30.5	36.77	8	71.5	22	9.63	7	39.8	2	57.43	7	27.4	4	54.91	4	55.9	21
Feb. 9.4	36.76	1	73.6	21	9.65	2	40.2	4	57.44	1	28.0	6	54.91	0	57.7	18
19.4	36.66	10	75.7	21	9.61	4	40.6	4	57.41	3	28.6	6	54.86	5	59.2	15
29.4	36.48	18	77.6	19	9.52	9	41.2	6	57.32	9	29.3	7	54.76	10	60.5	13
Mar. 10.4	36.24	24	79.2	16	9.40	12	41.7	5	57.20	12	29.9	6	54.63	13	61.5	10
20.3	35.95	29	80.4	12	9.26	14	42.2	5	57.05	15	30.5	6	54.48	15	62.2	7
30.3	35.63	32	81.3	9	9.10	16	42.6	4	56.88	17	31.0	5	54.31	17	62.6	4
Apr. 9.3	35.30	33	81.8	5	8.93	17	42.9	3	56.70	18	31.4	4	54.14	17	62.7	1
19.2	34.98	32	81.8	0	8.76	17	43.2	3	56.53	17	31.7	3	53.98	16	62.5	2
29.2	34.68	30	81.4	4	8.61	15	43.4	2	56.37	16	31.8	1	53.82	16	62.0	5
May 9.2	34.42	26	80.7	7	8.48	13	43.5	1	56.24	13	31.8	0	53.68	14	61.2	8
19.2	34.20	22	79.6	11	8.38	10	43.4	1	56.14	10	31.7	1	53.57	11	60.2	10
29.1	34.04	16	78.2	14	8.32	6	43.4	0	56.07	7	31.5	2	53.49	8	59.0	12
June 8.1	33.95	9	76.5	17	8.30	2	43.2	2	56.04	3	31.2	3	53.44	5	57.6	14
18.1	33.93	2	74.6	19	8.31	1	43.0	2	56.05	1	30.8	4	53.43	1	56.0	16
28.1	33.98	5	72.5	21	8.36	5	42.7	3	56.10	5	30.3	5	53.45	2	54.3	17
July 8.0	34.09	11	70.4	21	8.45	9	42.4	3	56.19	9	29.8	5	53.50	5	52.5	18
18.0	34.27	18	68.2	22	8.57	12	42.1	3	56.31	12	29.3	5	53.59	9	50.6	19
28.0	34.51	24	66.0	22	8.73	16	41.7	4	56.47	16	28.7	6	53.71	12	48.8	18
Aug. 6.9	34.81	30	63.8	22	8.92	19	41.3	4	56.66	19	28.0	7	53.86	15	47.1	17
16.9	35.16	35	61.7	21	9.13	21	40.8	5	56.88	22	27.3	7	54.04	18	45.6	15
26.9	35.56	40	59.7	20	9.37	24	40.3	5	57.13	25	26.6	7	54.25	21	44.3	13
Sept. 5.9	36.01	45	57.9	18	9.64	27	39.7	6	57.41	28	25.8	8	54.48	23	43.3	10
15.8	36.50	49	56.3	16	9.93	29	39.0	7	57.71	30	25.0	8	54.73	25	42.7	6
25.8	37.02	52	54.9	14	10.24	31	38.2	8	58.02	31	24.2	8	55.00	27	42.4	3
Oct. 5.8	37.56	54	53.7	12	10.56	32	37.4	8	58.35	33	23.3	9	55.29	29	42.5	1
15.8	38.12	56	52.8	9	10.90	34	36.5	9	58.69	34	22.4	9	55.59	30	43.1	6
25.7	38.69	57	52.2	6	11.25	35	35.6	9	59.04	35	21.5	9	55.90	31	44.1	10
Nov. 4.7	39.27	58	51.9	3	11.60	35	34.7	9	59.40	36	20.6	9	56.22	32	45.5	14
14.7	39.84	57	52.0	1	11.94	34	33.8	9	59.76	36	19.8	8	56.53	31	47.2	17
24.6	40.38	54	52.5	5	12.28	34	33.0	8	60.11	35	19.1	7	56.83	30	49.2	20
Dec. 4.6	40.88	50	53.4	9	12.60	32	32.3	7	60.43	32	18.6	5	57.11	28	51.4	22
14.6	41.34	46	54.5	11	12.89	29	31.7	6	60.73	30	18.2	4	57.36	25	53.8	24
24.6	41.73	39	56.0	15	13.14	25	31.2	5	60.99	26	18.0	2	57.57	21	56.3	25
34.5	42.04	31	57.8	18	13.35	21	31.0	2	61.21	22	18.0	0	57.74	17	58.8	25
Sec δ, Tan δ	1.937		+1.659		1.100		+0.458		1.135		+0.537		1.032		−0.256	
Mean Place	34ˢ.108		62″.44		8ˢ.242		35″.07		55ˢ.990		22″.30		53ˢ.745		57″.43	
D′ψ α, Dω α	+0.04		+0.04		+0.01		+0.01		+0.01		+0.02		−0.01		−0.01	
Dψ δ, Dω δ	−0.2		+0.9		−0.2		+0.9		−0.2		+0.9		−0.2		+0.9	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	ξ Argûs. Mag. 3.5 Right Ascension.		ξ Argûs. Declination S.		φ Geminorum. Mag. 5.0 Right Ascension.		φ Geminorum. Declination N.		26 Lyncis. Mag. 5.7 Right Ascension.		26 Lyncis. Declination N.		Groombridge 1874. Mag. 5.6 Right Ascension.		Groombridge 1874. Declination N.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	7 45		−24 38		7 48		+26 59		7 48		+47 47		7 49		+74 9	
	s		″		s		″		s		″		s		″	
Jan. 0.5	36.55		8.5		7.88		43.9		20.16		39.6		45.55		17.4	
10.5	36.69	14	11.4	29	8.07	19	43.9	0	20.40	24	40.8	12	46.01	46	20.0	26
20.5	36.78	9	14.1	27	8.21	14	44.1	2	20.57	17	42.2	14	46.30	29	22.7	27
30.5	36.82	4	16.7	26	8.29	8	44.5	4	20.66	9	43.8	16	46.42	12	25.4	27
Feb. 9.4	36.80	2	19.0	23	8.32	3	45.0	5	20.68	2	45.5	17	46.38	4	28.2	28
19.4	36.73	7	21.0	20	8.29	3	45.6	6	20.64	4	47.1	16	46.18	20	30.9	27
29.4	36.62	11	22.7	17	8.21	8	46.2	6	20.53	11	48.6	15	45.83	35	33.3	24
Mar. 10.4	36.48	14	24.1	14	8.10	11	46.8	6	20.37	16	50.0	14	45.36	47	35.3	20
20.3	36.31	17	25.1	10	7.96	14	47.4	6	20.17	20	51.2	12	44.79	57	36.9	16
30.3	36.12	19	25.8	7	7.79	17	47.9	5	19.94	23	52.1	9	44.15	64	38.1	12
Apr. 9.3	35.93	19	26.0	2	7.62	17	48.3	4	19.70	24	52.7	6	43.48	67	38.7	6
19.2	35.75	18	25.9	1	7.45	17	48.6	3	19.46	24	52.9	2	42.82	66	38.8	1
29.2	35.57	18	25.4	5	7.30	15	48.8	2	19.24	22	52.8	1	42.18	64	38.4	4
May 9.2	35.41	16	24.6	8	7.17	13	48.9	1	19.05	19	52.4	4	41.59	59	37.4	10
19.2	35.28	13	23.4	12	7.06	11	48.8	1	18.89	16	51.7	7	41.09	50	36.0	14
29.1	35.18	10	22.0	14	6.99	7	48.6	2	18.78	11	50.8	9	40.69	40	34.2	18
June 8.1	35.11	7	20.3	17	6.96	3	48.4	2	18.72	6	49.7	11	40.39	30	32.1	21
18.1	35.07	4	18.4	19	6.96	0	48.1	3	18.70	2	48.3	14	40.21	18	29.7	24
28.1	35.07	0	16.3	21	7.00	4	47.7	4	18.74	4	46.8	15	40.17	4	27.0	27
July 8.0	35.11	4	14.1	22	7.08	8	47.3	4	18.83	9	45.2	16	40.25	8	24.2	28
18.0	35.19	8	11.8	23	7.20	12	46.8	5	18.97	14	43.5	17	40.46	21	21.3	29
28.0	35.30	11	9.5	23	7.35	15	46.2	6	19.15	18	41.8	17	40.80	34	18.4	29
Aug. 6.9	35.44	14	7.4	21	7.53	18	45.6	6	19.38	23	40.1	17	41.26	46	15.6	28
16.9	35.61	17	5.4	20	7.74	21	45.0	6	19.65	27	38.4	17	41.82	56	12.9	27
26.9	35.81	20	3.7	17	7.98	24	44.3	7	19.96	31	36.7	17	42.48	66	10.3	26
Sept. 5.9	36.04	23	2.3	14	8.24	26	43.5	8	20.30	34	35.1	16	43.24	76	7.9	24
15.8	36.30	26	1.3	10	8.53	29	42.7	8	20.67	37	33.6	15	44.07	83	5.8	21
25.8	36.58	28	0.8	5	8.84	31	41.8	9	21.07	40	32.2	14	44.97	90	4.0	18
Oct. 5.8	36.88	30	0.7	1	9.17	33	40.8	10	21.49	42	31.0	12	45.93	96	2.6	14
15.8	37.19	31	1.1	4	9.51	34	39.8	10	21.93	44	29.9	11	46.93	100	1.5	11
25.7	37.51	32	2.0	9	9.86	35	38.8	10	22.38	45	29.1	8	47.95	102	0.9	6
Nov. 4.7	37.84	33	3.4	14	10.22	36	37.9	9	22.84	46	28.5	6	48.97	102	0.7	2
14.7	38.16	32	5.3	19	10.58	36	37.0	9	23.29	45	28.2	3	49.97	100	1.0	3
24.6	38.47	31	7.5	22	10.92	34	36.2	8	23.73	44	28.1	1	50.93	96	1.7	7
Dec. 4.6	38.76	29	10.1	26	11.25	33	35.5	7	24.15	42	28.3	2	51.83	90	2.9	12
14.6	39.01	25	12.8	27	11.55	30	35.0	5	24.53	38	28.8	5	52.63	80	4.5	16
24.6	39.22	21	15.7	29	11.82	27	34.7	3	24.87	34	29.6	8	53.31	68	6.5	20
34.5	39.39	17	18.6	29	12.05	23	34.6	1	25.15	28	30.7	11	53.86	55	8.8	23
Sec δ, Tan δ	1.100		−0.459		1.122		+0.509		1.489		+1.103		3.663		+3.524	
Mean Place	$35^{s}.596$		$17''.96$		$6^{s}.852$		$39''.89$		$18^{s}.626$		$37''.10$		$41^{s}.065$		$15''.95$	
$D'_\psi a$, $D_\omega a$	−0.01		−0.01		+0.01		+0.02		+0.03		+0.03		+0.08		+0.11	
$D_\psi \delta$, $D_\omega \delta$	−0.2		+0.9		−0.2		+0.9		−0.2		+0.9		−0.2		+0.9	

[Eph 12]

an Solar Date.	**χ Argûs.** Mag. 3.6				**ω Cancri.** Mag. 5.9				**χ Geminorum.** Mag. 5.0				**27 Lyncis.** Mag. 4.9			
	Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination N.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	7 54		−52 44		7 55		+25 37		7 58		+28 2		8 1		+51 45	
	s		″		s		″		s		″		s		″	
n. 0.6	34.08		33.1		37.51		67.8		8.02		33.8		52.46		42.0	
10.5	34.22	14	36.8	37	37.71	20	67.6	2	8.23	21	33.8	0	52.73	27	43.4	14
20.5	34.28	6	40.5	37	37.85	14	67.7	1	8.38	15	34.1	3	52.92	19	45.0	16
30.5	34.27	1	44.0	35	37.94	9	68.0	3	8.47	9	34.5	4	53.04	12	46.8	18
b. 9.4	34.18	9	47.3	33	37.97	3	68.4	4	8.51	4	35.0	5	53.08	4	48.6	18
19.4	34.03	15	50.3	30	37.95	2	68.9	5	8.49	2	35.7	7	53.04	4	50.5	19
29.4	33.82	21	53.0	27	37.88	7	69.5	6	8.42	7	36.4	7	52.93	11	52.3	18
ar. 10.4	33.56	26	55.2	22	37.77	11	70.1	6	8.31	11	37.1	7	52.77	16	53.9	16
20.3	33.26	30	56.9	17	37.64	13	70.7	6	8.17	14	37.8	7	52.56	21	55.2	13
30.3	32.94	32	58.2	13	37.48	16	71.2	5	8.01	16	38.3	5	52.32	24	56.3	11
r. 9.3	32.61	33	59.0	8	37.31	17	71.7	5	7.84	17	38.8	5	52.06	26	57.0	7
19.3	32.27	34	59.3	3	37.15	16	72.1	4	7.67	17	39.2	4	51.80	26	57.4	4
29.2	31.94	33	59.0	3	37.00	15	72.3	2	7.51	16	39.4	2	51.55	25	57.4	0
ay 9.2	31.64	30	58.2	8	36.87	13	72.4	1	7.37	14	39.5	1	51.33	22	57.0	4
19.2	31.37	27	57.0	12	36.76	11	72.4	0	7.26	11	39.5	0	51.14	19	56.3	7
29.1	31.13	24	55.4	16	36.68	8	72.3	1	7.18	8	39.3	2	51.00	14	55.3	10
ne 8.1	30.94	19	53.3	21	36.64	4	72.1	2	7.14	4	39.0	3	50.90	10	54.1	12
18.1	30.79	15	50.9	24	36.64	0	71.9	2	7.14	0	38.6	4	50.86	4	52.6	15
28.1	30.69	10	48.2	27	36.68	4	71.6	3	7.17	3	38.2	4	50.88	2	50.9	17
ly 8.0	30.65	4	45.3	29	36.75	7	71.2	4	7.24	7	37.7	5	50.95	7	49.1	18
18.0	30.66	1	42.2	31	36.86	11	70.8	4	7.35	11	37.1	6	51.07	12	47.2	19
28.0	30.73	7	39.1	31	37.00	14	70.3	5	7.49	14	36.4	7	51.25	18	45.2	20
ug. 7.0	30.86	13	36.1	30	37.17	17	69.7	6	7.66	17	35.7	7	51.47	22	43.2	20
16.9	31.04	18	33.3	28	37.37	20	69.1	6	7.86	20	34.9	8	51.74	27	41.2	20
26.9	31.27	23	30.7	26	37.60	23	68.4	7	8.09	23	34.1	8	52.05	31	39.3	19
pt. 5.9	31.55	28	28.5	22	37.86	26	67.6	8	8.35	26	33.2	9	52.40	35	37.5	18
15.8	31.87	32	26.7	18	38.14	28	66.8	8	8.64	29	32.3	9	52.78	38	35.7	18
25.8	32.23	36	25.5	12	38.44	30	65.9	9	8.95	31	31.3	10	53.20	42	34.1	16
t. 5.8	32.62	39	24.8	7	38.76	32	64.9	10	9.27	32	30.3	10	53.65	45	32.6	15
15.8	33.04	42	24.8	0	39.09	33	63.9	10	9.61	34	29.2	11	54.12	47	31.4	12
25.7	33.47	43	25.4	6	39.44	35	62.8	11	9.97	36	28.1	11	54.60	48	30.4	10
v. 4.7	33.90	43	26.7	13	39.79	35	61.8	10	10.33	36	27.1	10	55.09	49	29.6	8
14.7	34.32	42	28.6	19	40.15	36	60.8	10	10.69	36	26.1	10	55.58	49	29.1	5
24.7	34.71	39	31.0	24	40.50	35	59.9	9	11.04	35	25.3	8	56.06	48	29.0	1
c. 4.6	35.06	35	33.9	29	40.83	33	59.1	8	11.38	34	24.6	7	56.52	46	29.2	2
14.6	35.37	31	37.2	33	41.13	30	58.5	6	11.70	32	24.0	6	56.94	42	29.8	6
24.6	35.62	25	40.7	35	41.40	27	58.0	5	11.98	28	23.7	3	57.31	37	30.8	10
34.5	35.80	18	44.3	36	41.63	23	57.8	2	12.21	23	23.6	1	57.62	31	32.0	12
δ, Tan δ	1.652		−1.315		1.109		+0.480		1.133		+0.533		1.616		+1.269	
n Place	32ˢ.514		45″.90		36ˢ.505		63″.96		6ˢ.987		30″.34		50ˢ.746		40″.70	
a, $D_\omega a$	−0.03		−0.04		+0.01		+0.02		+0.01		+0.02		+0.03		+0.04	
δ, $D_\omega \delta$	−0.2		+0.9		−0.2		+0.9		−0.2		+0.9		−0.2		+0.9	

Mean Solar Date.	*ρ* **Argûs.** Mag. 2.9				**8 H. Ursæ Majoris.** Mag. 5.5				*γ* **Argûs.** Mag. 2.2				**ζ Cancri (*mean*).** Mag. 4.7			
	Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination N.	
	h m 8 3		° ′ −24 2		h m 8 4		° ′ +68 43		h m 8 6		° ′ −47 4		h m 8 7		° ′ +17 54	
	s		″		s		″		s		″		s		″	
Jan. 0.6	48.65		49.9		7.45		63.9		50.58		24.1		10.92		54.5	
10.5	48.81	16	52.8	29	7.85	40	66.1	22	50.74	16	27.7	36	11.12	20	53.9	6
20.5	48.92	11	55.6	28	8.13	28	68.6	25	50.83	9	31.3	36	11.27	15	53.4	5
30.5	48.97	5	58.2	26	8.28	15	71.2	26	50.85	2	34.7	34	11.36	9	53.2	2
Feb. 9.5	48.97	0	60.6	24	8.31	3	73.8	26	50.80	5	37.9	32	11.40	4	53.1	1
19.4	48.93	4	62.7	21	8.21	10	76.3	25	50.70	10	40.9	30	11.39	1	53.2	1
29.4	48.84	9	64.5	18	7.99	22	78.6	23	50.54	16	43.6	27	11.34	5	53.4	2
Mar. 10.4	48.71	13	66.0	15	7.68	31	80.7	21	50.33	21	45.8	22	11.25	9	53.7	3
20.3	48.56	15	67.1	11	7.29	39	82.4	17	50.09	24	47.6	18	11.13	12	54.1	4
30.3	48.39	17	67.8	7	6.84	45	83.7	13	49.82	27	48.9	13	10.99	14	54.5	4
Apr. 9.3	48.21	18	68.2	4	6.36	48	84.5	8	49.54	28	49.7	8	10.83	16	54.8	3
19.3	48.02	19	68.2	0	5.87	49	84.8	3	49.26	28	50.0	3	10.67	16	55.2	4
29.2	47.84	18	67.9	3	5.40	47	84.6	2	48.98	28	49.9	1	10.52	15	55.5	3
May 9.2	47.68	16	67.2	7	4.97	43	84.0	6	48.72	26	49.3	6	10.39	13	55.8	3
19.2	47.54	14	66.2	10	4.59	38	82.9	11	48.49	23	48.2	11	10.29	10	56.0	2
29.2	47.43	11	64.9	13	4.28	31	81.4	15	48.29	20	46.7	15	10.21	8	56.2	2
June 8.1	47.35	8	63.3	16	4.06	22	79.5	19	48.12	17	44.8	19	10.17	4	56.4	2
18.1	47.30	5	61.5	18	3.92	14	77.3	22	47.99	13	42.6	22	10.16	1	56.5	1
28.1	47.29	1	59.5	20	3.87	5	74.9	24	47.91	8	40.1	25	10.18	2	56.6	1
July 8.0	47.31	2	57.4	21	3.92	5	72.3	26	47.88	3	37.3	28	10.24	6	56.6	0
18.0	47.37	6	55.2	22	4.07	15	69.6	27	47.89	1	34.4	29	10.33	9	56.6	0
28.0	47.46	9	53.1	21	4.31	24	66.9	27	47.95	6	31.5	29	10.45	12	56.5	1
Aug. 7.0	47.58	12	51.0	21	4.63	32	64.2	27	48.06	11	28.6	29	10.60	15	56.3	2
16.9	47.74	16	49.0	20	5.04	41	61.5	27	48.22	16	25.9	27	10.78	18	56.1	2
26.9	47.93	19	47.3	17	5.52	48	58.9	26	48.42	20	23.4	25	10.99	21	55.8	3
Sept. 5.9	48.15	22	45.9	14	6.07	55	56.5	24	48.67	25	21.2	22	11.22	23	55.3	5
15.9	48.39	24	44.9	10	6.69	62	54.3	22	48.96	29	19.5	17	11.48	26	54.7	6
25.8	48.66	27	44.3	6	7.36	67	52.4	19	49.28	32	18.3	12	11.76	28	53.9	8
Oct. 5.8	48.95	29	44.1	2	8.08	72	50.7	17	49.63	35	17.7	6	12.06	30	53.0	9
15.8	49.26	31	44.4	3	8.83	75	49.4	13	50.01	38	17.6	1	12.37	31	52.0	10
25.7	49.58	32	45.3	9	9.60	77	48.5	9	50.40	39	18.1	5	12.70	33	50.9	11
Nov. 4.7	49.91	33	46.7	14	10.39	79	48.0	5	50.80	40	19.3	12	13.04	34	49.7	12
14.7	50.23	32	48.5	18	11.17	78	47.9	1	51.19	39	21.1	18	13.38	34	48.4	1
24.7	50.54	31	50.6	21	11.93	76	48.3	4	51.56	37	23.4	23	13.71	33	47.2	1
Dec. 4.6	50.84	30	53.1	25	12.65	72	49.1	8	51.90	34	26.2	28	14.03	32	46.0	1
14.6	51.11	27	55.8	27	13.31	66	50.4	13	52.21	31	29.4	32	14.33	30	44.9	1
24.6	51.34	23	58.7	29	13.88	57	52.0	16	52.47	26	32.8	34	14.60	27	44.0	
34.6	51.53	19	61.6	29	14.35	47	54.0	20	52.67	20	36.4	36	14.83	23	43.2	
Sec δ, Tan δ	1.095		−0.446		2.757		+2.570		1.468		−1.075		1.051		+0.323	
Mean Place	$47^{s}.763$		$59''.87$		$4^{s}.179$		$63''.58$		$49^{s}.298$		$37''.01$		$10^{s}.019$		$50''.24$	
$D'_{\psi}\alpha$, $D_{\omega}\alpha$	−0.01		−0.02		+0.06		+0.09		−0.02		−0.04		+0.01		+0.01	
$D_{\psi}\delta$, $D_{\omega}\delta$	−0.2		+0.9		−0.2		+0.9		−0.2		+0.9		−0.2		+0.8	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	Bradley 1147. Mag. 5.7				20 Puppis. Mag. 5.0				β Cancri. Mag. 3.8				31 Lyncis. Mag. 4.4			
	Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination N.	
	h m 8 8		° ′ +76 1		h m 8 9		° ′ −15 31		h m 8 11		° ′ + 9 27		h m 8 16		° ′ +43 28	
	s		″		s		″		s		″		s		″	
Jan. 0.6	36.12		36.4		18.10		12.1		45.47		32.0		50.42		17.5	
10.5	36.69	57	38.9	25	18.27	17	14.6	25	45.66	19	30.9	11	50.68	26	18.4	9
20.5	37.08	39	41.6	27	18.39	12	17.0	24	45.80	14	29.9	10	50.87	19	19.5	11
30.5	37.28	20	44.4	28	18.46	7	19.2	22	45.90	10	29.1	8	51.00	13	20.8	13
Feb. 9.5	37.30	2	47.3	29	18.48	2	21.2	20	45.94	4	28.5	6	51.06	6	22.2	14
19.4	37.13	17	50.1	28	18.45	3	22.9	17	45.93	1	28.1	4	51.06	0	23.7	15
29.4	36.79	34	52.7	26	18.38	7	24.4	15	45.88	5	27.9	2	50.99	7	25.1	14
Mar. 10.4	36.30	49	54.9	22	18.27	11	25.6	12	45.79	9	27.8	1	50.87	12	26.5	14
20.3	35.69	61	56.7	18	18.13	14	26.5	9	45.67	12	27.8	0	50.71	16	27.8	13
30.3	34.99	70	58.1	14	17.98	15	27.0	5	45.53	14	28.0	2	50.52	19	28.8	10
Apr. 9.3	34.24	75	59.0	9	17.82	16	27.2	2	45.38	15	28.3	3	50.31	21	29.6	8
19.3	33.47	77	59.3	3	17.65	17	27.1	1	45.23	15	28.6	3	50.09	22	30.1	5
29.2	32.72	75	59.1	2	17.49	16	26.8	3	45.09	14	28.9	3	49.89	20	30.3	2
May 9.2	32.03	69	58.3	8	17.34	15	26.2	6	44.97	12	29.3	4	49.71	18	30.2	1
19.2	31.41	62	57.1	12	17.22	12	25.3	9	44.87	10	29.7	4	49.55	16	29.9	3
29.2	30.89	52	55.4	17	17.13	9	24.2	11	44.79	8	30.2	5	49.43	12	29.3	6
June 8.1	30.48	41	53.3	21	17.06	7	22.9	13	44.74	5	30.7	5	49.35	8	28.5	8
18.1	30.21	27	50.9	24	17.02	4	21.4	15	44.72	2	31.2	5	49.31	4	27.4	11
28.1	30.07	14	48.3	26	17.02	0	19.8	16	44.74	2	31.7	5	49.31	0	26.2	12
July 8.0	30.08	1	45.5	28	17.05	3	18.0	18	44.79	5	32.2	5	49.36	5	24.8	14
18.0	30.23	15	42.5	30	17.11	6	16.2	18	44.87	8	32.7	5	49.46	10	23.3	15
28.0	30.52	29	39.4	31	17.20	9	14.5	17	44.98	11	33.1	4	49.60	14	21.7	16
Aug. 7.0	30.95	43	36.4	30	17.33	13	12.8	17	45.12	14	33.4	3	49.78	18	20.0	17
16.9	31.51	56	33.5	29	17.48	15	11.2	16	45.29	17	33.6	2	50.00	22	18.4	16
26.9	32.19	68	30.7	28	17.66	18	9.9	13	45.48	19	33.7	1	50.25	25	16.7	17
Sept. 5.9	32.97	78	28.1	26	17.87	21	8.9	10	45.70	22	33.6	1	50.54	29	15.0	17
15.9	33.85	88	25.7	24	18.11	24	8.2	7	45.94	24	33.3	3	50.86	32	13.3	17
25.8	34.82	97	23.6	21	18.37	26	7.8	4	46.20	26	32.8	5	51.21	35	11.7	16
Oct. 5.8	35.86	104	21.9	17	18.65	28	7.8	0	46.48	28	32.1	7	51.58	37	10.2	15
15.8	36.95	109	20.5	14	18.95	30	8.3	5	46.78	30	31.2	9	51.98	40	8.8	14
25.7	38.08	113	19.6	9	19.26	31	9.2	9	47.10	32	30.1	11	52.40	42	7.6	12
Nov. 4.7	39.23	115	19.1	5	19.57	31	10.5	13	47.43	33	28.8	13	52.83	43	6.6	10
14.7	40.37	114	19.1	0	19.89	32	12.2	17	47.76	33	27.4	14	53.26	43	5.8	8
24.7	41.46	109	19.6	5	20.20	31	14.2	20	48.08	32	25.9	15	53.68	42	5.2	6
Dec. 4.6	42.49	103	20.6	10	20.50	30	16.5	23	48.39	31	24.4	15	54.09	41	4.9	3
14.6	43.43	94	22.1	15	20.78	28	19.0	25	48.68	29	22.9	15	54.47	38	5.0	1
24.6	44.25	82	24.0	19	21.02	24	21.6	26	48.94	26	21.5	14	54.82	35	5.3	3
34.6	44.92	67	26.2	22	21.22	20	24.2	26	49.16	22	20.2	13	55.12	30	6.0	7
Sec δ, Tan δ	4.142		+4.019		1.038		−0.278		1.014		+0.167		1.378		+0.948	
Mean Place	30ˢ.970		36″.62		17ˢ.282		20″.96		44ˢ.637		26″.74		49ˢ.050		16″.60	
D′ψ α, Dω α	+0.09		+0.14		−0.01		−0.01		0.00		+0.01		+0.02		+0.04	
Dψ δ, Dω δ	−0.2		+0.8		−0.2		+0.8		−0.2		+0.8		−0.2		+0.8	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	d^1 Cancri. Mag. 5.9				ε Argûs. Mag. 1.7				30 Monocerotis. Mag. 4.0				o Ursæ Majoris. Mag. 3.5			
	Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination S.		Right Ascension.		Declination N.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	8 18		+18 36		8 20		−59 13		8 21		− 3 36		8 22		+61 0	
	s		″		s		″		s		″		s		″	
Jan. 0.6	20.51		59.2		44.26		18.8		16.63		60.2		60.17		47.1	
10.5	20.72	21	58.5	7	44.44	18	22.6	38	16.82	19	62.1	19	60.53	36	48.8	17
20.5	20.88	16	58.1	4	44.54	10	26.4	38	16.96	14	63.9	18	60.80	27	50.8	20
30.5	20.99	11	57.9	2	44.55	1	30.2	38	17.06	10	65.5	16	60.97	17	53.0	22
Feb. 9.5	21.04	5	57.9	0	44.48	7	33.8	36	17.10	4	66.9	14	61.04	7	55.3	23
19.4	21.04	0	58.0	1	44.33	15	37.1	33	17.09	1	68.1	12	61.02	2	57.6	23
29.4	21.00	4	58.2	2	44.10	23	40.1	30	17.04	5	69.0	9	60.91	11	59.8	22
Mar. 10.4	20.91	9	58.5	3	43.81	29	42.7	26	16.95	9	69.7	7	60.72	19	61.8	20
20.4	20.79	12	58.9	4	43.48	33	44.9	22	16.84	11	70.2	5	60.46	26	63.5	17
30.3	20.65	14	59.4	5	43.11	37	46.6	17	16.70	14	70.4	2	60.15	31	64.9	14
Apr. 9.3	20.50	15	59.8	4	42.72	39	47.9	13	16.55	15	70.4	0	59.81	34	65.9	10
19.3	20.35	15	60.2	4	42.32	40	48.6	7	16.40	15	70.2	2	59.47	34	66.5	6
29.2	20.20	15	60.6	4	41.93	39	48.8	2	16.26	14	69.9	3	59.13	34	66.7	2
May 9.2	20.07	13	60.9	3	41.55	38	48.4	4	16.13	13	69.4	5	58.81	32	66.4	3
19.2	19.96	11	61.2	3	41.19	36	47.6	8	16.02	11	68.8	6	58.53	28	65.6	8
29.2	19.88	8	61.4	2	40.86	33	46.3	13	15.93	9	68.0	8	58.30	23	64.5	11
June 8.1	19.82	6	61.5	1	40.58	28	44.5	18	15.87	6	67.1	9	58.13	17	63.0	15
18.1	19.80	2	61.6	1	40.35	23	42.3	22	15.84	3	66.1	10	58.02	11	61.2	18
28.1	19.81	1	61.6	0	40.17	18	39.8	25	15.84	0	65.0	11	57.98	4	59.2	20
July 8.1	19.86	5	61.6	0	40.05	12	37.0	28	15.87	3	63.8	12	58.00	2	57.0	22
18.0	19.94	8	61.5	1	40.00	5	34.0	30	15.93	6	62.6	12	58.09	9	54.6	24
28.0	20.06	12	61.4	1	40.02	2	30.9	31	16.03	10	61.5	11	58.25	16	52.1	25
Aug. 7.0	20.20	14	61.2	2	40.10	8	27.8	31	16.15	12	60.5	10	58.48	23	49.6	25
16.9	20.37	17	60.9	3	40.24	14	24.8	30	16.30	15	59.6	9	58.76	28	47.1	25
26.9	20.57	20	60.4	5	40.45	21	22.0	28	16.47	17	58.8	8	59.10	34	44.6	25
Sept. 5.9	20.79	22	59.8	6	40.73	28	19.5	25	16.67	20	58.3	5	59.50	40	42.2	24
15.9	21.04	25	59.1	7	41.07	34	17.4	21	16.90	23	58.1	2	59.95	45	40.0	22
25.8	21.31	27	58.3	8	41.46	39	15.8	16	17.15	25	58.1	0	60.44	49	37.9	21
Oct. 5.8	21.61	30	57.3	10	41.89	43	14.8	10	17.42	27	58.5	4	60.97	53	36.1	18
15.8	21.92	31	56.2	11	42.35	46	14.4	4	17.71	29	59.2	7	61.53	56	34.5	16
25.8	22.24	32	55.0	12	42.84	49	14.7	3	18.02	31	60.2	10	62.12	59	33.2	13
Nov. 4.7	22.58	34	53.7	13	43.34	50	15.6	9	18.34	32	61.6	14	62.73	61	32.3	9
14.7	22.92	34	52.4	13	43.83	49	17.1	15	18.66	32	63.2	16	63.34	61	31.8	5
24.7	23.26	34	51.1	13	44.29	46	19.3	22	18.97	31	65.0	18	63.94	60	31.7	1
Dec. 4.6	23.59	33	49.9	12	44.72	43	22.0	27	19.28	31	66.9	19	64.51	57	32.0	3
14.6	23.90	31	48.8	11	45.10	38	25.1	31	19.56	28	69.0	21	65.05	54	32.7	7
24.6	24.18	28	47.8	10	45.41	31	28.6	35	19.81	25	71.1	21	65.53	48	33.8	11
34.6	24.42	24	47.0	8	45.65	24	32.3	37	20.03	22	73.1	20	65.94	41	35.3	15
Sec δ, Tan δ	1.055		+0.337		1.954		−1.679		1.002		−0.064		2.064		+1.805	
Mean Place	$19^{s}.620$		$55''.40$		$42^{s}.545$		$33''.84$		$15^{s}.870$		$67''.34$		$57^{s}.868$		$47''.96$	
D′ψ α, Dω α	+0.01		+0.01		−0.04		−0.06		0.00		0.00		+0.04		+0.07	
Dψ δ, Dω δ	−0.2		+0.8		−0.2		+0.8		−0.2		+0.8		−0.2		+0.8	

Mean Solar Date.	θ Chamæleontis. Mag. 4.3				Groombridge 1450. Mag. 6.0				η Cancri. Mag. 5.5				Groombridge 1446 Mag. 6.3			
	Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination N.	
	h m 8 23		° ′ −77 11		h m 8 27		° ′ +38 18		h m 8 27		° ′ +20 44		h m 8 29		° ′ +73 55	
	s		″		s		″		s		″		s		″	
Jan. 0.6	22.25	26	47.0	37	13.19	26	69.0	5	38.23	22	29.8	5	61.37	57	76.2	23
10.5	22.51	7	50.7	38	13.45	20	69.5	7	38.45	17	29.3	4	61.94	42	78.5	25
20.5	22.58	12	54.5	38	13.65	13	70.2	10	38.62	12	28.9	1	62.36	26	81.0	27
30.5	22.46	30	58.3	37	13.78	7	71.2	11	38.74	7	28.8	1	62.62	9	83.7	28
Feb. 9.5	22.16	47	62.0	35	13.85	1	72.3	12	38.81	1	28.9	3	62.71	7	86.5	27
19.4	21.69	63	65.5	32	13.86	5	73.5	13	38.82	4	29.2	3	62.64	22	89.2	26
29.4	21.06	76	68.7	29	13.81	10	74.8	13	38.78	8	29.5	4	62.42	36	91.8	24
Mar. 10.4	20.30	86	71.6	25	13.71	14	76.1	11	38.70	11	29.9	5	62.06	48	94.2	21
20.4	19.44	94	74.1	20	13.57	17	77.2	10	38.59	14	30.4	5	61.58	57	96.3	16
30.3	18.50	100	76.1	15	13.40	18	78.2	8	38.45	15	30.9	5	61.01	62	97.9	11
Apr. 9.3	17.50	103	77.6	10	13.22	19	79.0	6	38.30	15	31.4	5	60.39	65	99.0	6
19.3	16.47	104	78.6	5	13.03	18	79.6	3	38.15	15	31.9	4	59.74	65	99.6	1
29.2	15.43	102	79.1	1	12.85	17	79.9	1	38.00	14	32.3	3	59.09	62	99.7	5
May 9.2	14.41	97	79.0	6	12.68	15	80.0	1	37.86	11	32.6	2	58.47	56	99.2	10
19.2	13.44	90	78.4	11	12.53	11	79.9	4	37.75	9	32.8	2	57.91	49	98.2	14
29.2	12.54	82	77.3	16	12.42	8	79.5	6	37.66	6	33.0	1	57.42	39	96.8	18
June 8.1	11.72	72	75.7	20	12.34	4	78.9	8	37.60	3	33.1	0	57.03	28	95.0	22
18.1	11.00	59	73.7	24	12.30	0	78.1	10	37.57	1	33.1	1	56.75	17	92.8	25
28.1	10.41	45	71.3	27	12.30	4	77.1	11	37.58	4	33.0	2	56.58	6	90.3	28
July 8.1	9.96	30	68.6	30	12.34	8	76.0	12	37.62	7	32.8	2	56.52	7	87.5	29
18.0	9.66	14	65.6	31	12.42	12	74.8	13	37.69	11	32.6	3	56.59	19	84.6	30
28.0	9.52	2	62.5	32	12.54	15	73.5	14	37.80	13	32.3	4	56.78	31	81.6	30
Aug. 7.0	9.54	19	59.3	31	12.69	19	72.1	15	37.93	16	31.9	5	57.09	42	78.6	30
16.9	9.73	36	56.2	29	12.88	23	70.6	16	38.09	19	31.4	6	57.51	53	75.6	30
26.9	10.09	51	53.3	27	13.11	26	69.0	15	38.28	22	30.8	7	58.04	63	72.6	28
Sept. 5.9	10.60	66	50.6	23	13.37	29	67.5	16	38.50	25	30.1	8	58.67	72	69.8	26
15.9	11.26	79	48.3	18	13.66	32	65.9	15	38.75	27	29.3	10	59.39	80	67.2	23
25.8	12.05	89	46.5	13	13.98	35	64.4	15	39.02	29	28.3	11	60.19	87	64.9	20
Oct. 5.8	12.94	97	45.2	7	14.33	36	62.9	15	39.31	32	27.2	12	61.06	93	62.9	17
15.8	13.91	101	44.5	0	14.69	38	61.4	14	39.63	33	26.0	12	61.99	97	61.2	13
25.8	14.92	101	44.5	6	15.07	40	60.0	12	39.96	34	24.8	13	62.96	100	59.9	8
Nov. 4.7	15.93	99	45.1	13	15.47	40	58.8	10	40.30	35	23.5	14	63.96	101	59.1	4
14.7	16.92	93	46.4	19	15.87	40	57.8	8	40.65	34	22.1	13	64.97	98	58.7	1
24.7	17.85	83	48.3	25	16.27	39	57.0	6	40.99	33	20.8	12	65.95	94	58.8	6
Dec. 4.6	18.68	70	50.8	29	16.66	37	56.4	3	41.32	32	19.6	11	66.89	87	59.4	11
14.6	19.38	55	53.7	33	17.03	33	56.1	0	41.64	29	18.5	9	67.76	78	60.5	16
24.6	19.93	37	57.0	36	17.36	29	56.1	3	41.93	25	17.6	7	68.54	66	62.1	19
34.6	20.30		60.6		17.65		56.4		42.18		16.9		69.20		64.0	
Sec δ, Tan δ	4.514		−4.402		1.275		+0.790		1.069		+0.379		3.615		+3.473	
Mean Place	$17^{s}.853$		$63''.66$		$11^{s}.989$		$68''.18$		$37^{s}.337$		$26''.64$		$56^{s}.962$		$78''.18$	
$D'_{\psi}\alpha$, $D_{\omega}\alpha$	−0.09		−0.17		+0.02		+0.03		+0.01		+0.02		+0.07		+0.14	
$D_{\psi}\delta$, $D_{\omega}\delta$	−0.2		+0.8		−0.2		+0.8		−0.2		+0.8		−0.2		+0.8	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	δ Hydræ. Mag. 4.2				σ Hydræ. Mag. 4.5				γ Cancri. Mag. 4.7				δ Cancri. Mag. 4.2			
	Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination N.	
	h m 8 32		° ′ + 6 0		h m 8 34		° ′ + 3 38		h m 8 38		° ′ +21 46		h m 8 39		° ′ +18 28	
	s		″		s		″		s		″		s		″	
Jan. 0.6	60.69		45.9		10.29		69.5		12.65		70.9		42.03		45.1	
10.6	60.90	21	44.4	15	10.50	21	68.0	15	12.88	23	70.3	6	42.26	23	44.3	8
20.5	61.06	16	43.1	13	10.66	16	66.6	14	13.07	19	70.0	3	42.44	18	43.8	5
30.5	61.17	11	42.1	10	10.78	12	65.4	12	13.20	13	69.9	1	42.57	13	43.5	3
Feb. 9.5	61.23	6	41.3	8	10.84	6	64.4	10	13.27	7	70.0	1	42.64	7	43.4	1
19.4	61.24	1	40.7	6	10.85	1	63.6	8	13.29	2	70.3	3	42.66	2	43.5	1
29.4	61.21	3	40.2	5	10.81	4	63.0	6	13.26	3	70.7	4	42.63	3	43.7	2
Mar. 10.4	61.13	8	39.9	3	10.74	7	62.7	3	13.19	7	71.2	5	42.56	7	44.1	4
20.4	61.02	11	39.8	1	10.64	10	62.5	2	13.09	10	71.8	6	42.46	10	44.5	4
30.3	60.89	13	39.9	1	10.51	13	62.5	0	12.96	13	72.4	6	42.34	12	45.0	5
Apr. 9.3	60.76	13	40.1	2	10.37	14	62.6	1	12.81	15	73.0	6	42.20	14	45.5	5
19.3	60.62	14	40.4	3	10.23	14	62.8	2	12.66	15	73.5	5	42.05	15	46.0	5
29.3	60.48	14	40.8	4	10.09	14	63.1	3	12.51	15	73.9	4	41.90	15	46.4	4
May 9.2	60.35	13	41.2	4	9.96	13	63.6	5	12.37	14	74.2	3	41.77	13	46.8	4
19.2	60.24	11	41.7	5	9.85	11	64.2	6	12.25	12	74.5	3	41.65	12	47.1	3
29.2	60.15	9	42.2	5	9.76	9	64.8	6	12.16	9	74.7	2	41.56	9	47.3	2
June 8.1	60.09	6	42.8	6	9.70	6	65.4	6	12.09	7	74.7	0	41.50	6	47.5	2
18.1	60.06	3	43.4	6	9.66	4	66.1	7	12.06	3	74.7	0	41.47	3	47.6	1
28.1	60.06	0	44.1	7	9.66	0	66.9	8	12.06	0	74.6	1	41.46	1	47.6	0
July 8.1	60.09	3	44.7	6	9.69	3	67.6	7	12.09	3	74.4	2	41.48	2	47.5	1
18.0	60.15	6	45.3	6	9.75	6	68.3	7	12.15	6	74.1	3	41.54	6	47.4	1
28.0	60.24	9	45.8	5	9.83	8	69.0	7	12.24	9	73.7	4	41.63	9	47.2	2
Aug. 7.0	60.35	11	46.3	5	9.94	11	69.6	6	12.37	13	73.2	5	41.75	12	46.9	3
17.0	60.49	14	46.7	4	10.08	14	70.1	5	12.52	15	72.6	6	41.90	15	46.5	4
26.9	60.66	17	46.9	2	10.25	17	70.4	3	12.70	18	71.9	7	42.08	18	46.0	5
Sept. 5.9	60.86	20	46.9	0	10.45	20	70.5	1	12.91	21	71.1	8	42.29	21	45.4	6
15.9	61.08	22	46.7	2	10.67	22	70.4	1	13.15	24	70.2	9	42.52	23	44.6	8
25.8	61.33	25	46.2	5	10.91	24	70.1	3	13.41	26	69.1	11	42.78	26	43.6	10
Oct. 5.8	61.60	27	45.5	7	11.18	27	69.5	6	13.70	29	67.9	12	43.06	28	42.5	11
15.8	61.90	30	44.6	9	11.47	29	68.6	9	14.01	31	66.6	13	43.36	30	41.3	12
25.8	62.21	31	43.5	11	11.78	31	67.5	11	14.34	33	65.3	13	43.68	32	40.0	13
Nov. 4.7	62.53	32	42.1	14	12.10	32	66.1	14	14.69	35	63.9	14	44.02	34	38.6	14
14.7	62.86	33	40.5	16	12.43	33	64.6	15	15.05	36	62.5	14	44.37	35	37.1	15
24.7	63.18	32	38.9	16	12.75	32	62.9	17	15.40	35	61.1	14	44.71	34	35.6	15
Dec. 4.7	63.49	31	37.2	17	13.06	31	61.1	18	15.74	34	59.9	12	45.04	33	34.2	14
14.6	63.79	30	35.5	17	13.36	30	59.3	18	16.06	32	58.8	11	45.36	32	33.0	12
24.6	64.06	27	33.8	17	13.63	27	57.5	18	16.35	29	57.8	10	45.66	30	31.9	11
34.6	64.30	24	32.2	16	13.86	23	55.8	17	16.61	26	57.1	7	45.91	25	31.0	9
Sec δ, Tan δ	1.006		+0.105		1.002		+0.064		1.077		+0.400		1.054		+0.334	
Mean Place	59ˢ.929		40″.48		9ˢ.552		63″.76		11ˢ.770		68″.25		41ˢ.187		42″.03	
D′ψ α, Dω α	0.00		0.00		0.00		0.00		+0.01		+0.02		+0.01		+0.01	
Dψ δ, Dω δ	−0.2		+0.8		−0.2		+0.8		−0.3		+0.8		−0.3		+0.8	

[Eph 12]

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	α Pyxidis. Mag. 3.7				ι Cancri. Mag. 4.2				ε Hydræ. Mag. 3.5				δ Argûs. Mag. 2.0			
	Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination S.	
	h m 8 40		° ′ −32 51		h m 8 41		° ′ +29 4		h m 8 42		° ′ + 6 44		h m 8 42		° ′ −54 22	
	s		″		s		″		s		″		s		″	
Jan. 0.6	4.15	20	54.9	33	23.53	24	58.1	1	7.78	22	37.4	14	17.53	21	53.1	37
10.6	4.35	14	58.2	32	23.77	20	58.0	1	8.00	17	36.0	12	17.74	14	56.8	38
20.5	4.49	9	61.4	31	23.97	15	58.1	3	8.17	12	34.8	11	17.88	7	60.6	37
30.5	4.58	3	64.5	29	24.12	8	58.4	6	8.29	7	33.7	8	17.95	1	64.3	36
Feb. 9.5	4.61	2	67.4	27	24.20	2	59.0	7	8.36	2	32.9	6	17.94	8	67.9	34
19.4	4.59	7	70.1	24	24.22	3	59.7	8	8.38	3	32.3	4	17.86	15	71.3	31
29.4	4.52	12	72.5	20	24.19	7	60.5	9	8.35	6	31.9	2	17.71	21	74.4	28
Mar. 10.4	4.40	15	74.5	17	24.12	11	61.4	9	8.29	10	31.7	1	17.50	26	77.2	23
20.4	4.25	17	76.2	13	24.01	14	62.3	8	8.19	13	31.6	1	17.24	29	79.5	19
30.3	4.08	19	77.5	9	23.87	16	63.1	7	8.06	13	31.7	2	16.95	31	81.4	14
Apr. 9.3	3.89	20	78.4	4	23.71	16	63.8	6	7.93	14	31.9	3	16.64	33	82.8	9
19.3	3.69	20	78.8	0	23.55	16	64.4	5	7.79	14	32.2	4	16.31	33	83.7	4
29.3	3.49	19	78.8	3	23.39	15	64.9	3	7.65	13	32.6	4	15.98	32	84.1	1
May 9.2	3.30	17	78.5	7	23.24	13	65.2	1	7.52	11	33.0	5	15.66	30	84.0	6
19.2	3.13	15	77.8	11	23.11	10	65.3	0	7.41	9	33.5	5	15.36	28	83.4	11
29.2	2.98	12	76.7	14	23.01	7	65.3	2	7.32	7	34.0	6	15.08	25	82.3	15
June 8.1	2.86	9	75.3	18	22.94	4	65.1	3	7.25	4	34.6	5	14.83	20	80.8	19
18.1	2.77	6	73.5	20	22.90	1	64.8	5	7.21	1	35.1	6	14.63	16	78.9	23
28.1	2.71	3	71.5	22	22.89	2	64.3	6	7.20	3	35.7	6	14.47	11	76.6	26
July 8.1	2.68	1	69.3	24	22.91	6	63.7	7	7.23	5	36.3	5	14.36	6	74.0	28
18.0	2.69	4	66.9	25	22.97	10	63.0	9	7.28	8	36.8	5	14.30	1	71.2	29
28.0	2.73	8	64.4	24	23.07	13	62.1	9	7.36	11	37.3	4	14.29	5	68.3	30
Aug. 7.0	2.81	12	62.0	22	23.20	16	61.2	10	7.47	13	37.7	3	14.34	11	65.3	29
17.0	2.93	15	59.8	20	23.36	19	60.2	11	7.60	16	38.0	1	14.45	17	62.4	28
26.9	3.08	19	57.8	18	23.55	22	59.1	12	7.76	19	38.1	0	14.62	22	59.6	25
Sept. 5.9	3.27	23	56.0	15	23.77	25	57.9	13	7.95	22	38.1	2	14.84	28	57.1	21
15.9	3.50	26	54.5	10	24.02	28	56.6	14	8.17	24	37.9	5	15.12	33	55.0	17
25.8	3.76	29	53.5	6	24.30	30	55.2	14	8.41	27	37.4	8	15.45	38	53.3	11
Oct. 5.8	4.05	31	52.9	0	24.60	33	53.8	14	8.68	29	36.6	10	15.83	41	52.2	5
15.8	4.36	33	52.9	5	24.93	35	52.4	15	8.97	30	35.6	12	16.24	43	51.7	1
25.8	4.69	35	53.4	11	25.28	36	50.9	14	9.27	32	34.4	14	16.67	45	51.8	7
Nov. 4.7	5.04	35	54.5	16	25.64	37	49.5	13	9.59	33	33.0	16	17.12	46	52.5	14
14.7	5.39	35	56.1	20	26.01	37	48.2	12	9.92	33	31.4	17	17.58	44	53.9	20
24.7	5.74	33	58.1	25	26.38	36	47.0	10	10.25	32	29.7	18	18.02	41	55.9	25
Dec. 4.7	6.07	31	60.6	29	26.74	34	46.0	8	10.57	30	27.9	17	18.43	38	58.4	39
14.6	6.38	27	63.5	30	27.08	32	45.2	6	10.87	28	26.2	16	18.81	32	61.4	34
24.6	6.65	23	66.5	32	27.40	28	44.6	4	11.15	24	24.6	15	19.13	26	64.8	36
34.6	6.88		69.7		27.68		44.2		11.39		23.1		19.39		68.4	
Sec δ, Tan δ	1.191		−0.646		1.144		+0.556		1.007		+0.118		1.717		−1.396	
Mean Place	3ˢ.329		67″.26		22ˢ.546		56″.78		7ˢ.042		32″.37		16ˢ.243		68″.77	
D′ψ α, Dω α	−0.01		−0.03		+0.01		+0.02		0.00		+0.01		−0.03		−0.06	
Dψ δ, Dω δ	−0.3		+0.8		−0.3		+0.8		−0.3		+0.8		−0.3		+0.8	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	σ^2 Cancri (*mean*). Mag. 5.5				ζ Hydræ. Mag. 3.3				ι Ursæ Majoris. Mag. 3.1				α Cancri. Mag. 4.3			
	Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination N.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	8 48		+30 54		8 50		+ 6 16		8 53		+48 22		8 53		+12 11	
	s		″		s		″		s		″		s		″	
Jan. 0.6	53.74		48.7		45.34		56.8		12.82		74.3		41.32		59.8	
10.6	54.00	26	48.6	1	45.57	23	55.3	15	13.14	32	75.1	8	41.55	23	58.7	11
20.5	54.21	21	48.8	2	45.75	18	54.0	13	13.39	25	76.3	12	41.74	19	57.7	10
30.5	54.37	16	49.2	4	45.88	13	52.9	11	13.58	19	77.8	15	41.88	14	57.0	7
Feb. 9.5	54.46	9	49.9	7	45.95	7	52.0	9	13.69	11	79.4	16	41.96	8	56.5	5
19.5	54.49	3	50.7	8	45.98	3	51.3	7	13.73	4	81.2	18	41.99	3	56.2	3
29.4	54.47	2	51.6	9	45.96	2	50.9	4	13.70	3	83.0	18	41.97	2	56.1	1
Mar. 10.4	54.40	7	52.6	10	45.90	6	50.7	2	13.61	9	84.7	17	41.92	5	56.1	0
20.4	54.30	10	53.6	10	45.81	9	50.6	1	13.46	15	86.3	16	41.84	8	56.3	2
30.3	54.16	14	54.5	9	45.69	12	50.6	0	13.27	19	87.7	14	41.72	12	56.6	3
Apr. 9.3	54.00	16	55.3	8	45.56	13	50.8	2	13.06	21	88.9	12	41.58	14	56.9	3
19.3	53.83	17	56.0	7	45.42	14	51.1	3	12.83	23	89.8	9	41.44	14	57.3	4
29.3	53.67	16	56.5	5	45.29	13	51.5	4	12.60	23	90.3	5	41.31	13	57.7	4
May 9.2	53.52	15	56.8	3	45.16	13	51.9	4	12.39	21	90.5	2	41.19	12	58.2	5
19.2	53.39	13	56.9	1	45.04	12	52.4	5	12.19	20	90.3	2	41.07	12	58.6	4
29.2	53.28	11	56.9	0	44.95	9	52.9	5	12.02	17	89.8	5	40.97	10	59.0	4
June 8.2	53.20	8	56.7	2	44.88	7	53.5	6	11.89	13	89.0	8	40.90	7	59.4	4
18.1	53.15	5	56.3	4	44.84	4	54.1	6	11.80	9	87.9	11	40.85	5	59.7	3
28.1	53.13	2	55.7	6	44.83	1	54.7	6	11.76	4	86.5	14	40.83	2	60.1	4
July 8.1	53.15	2	55.0	7	44.84	1	55.3	6	11.76	0	84.9	16	40.85	2	60.4	3
18.0	53.21	6	54.2	8	44.88	4	55.8	5	11.80	4	83.2	17	40.90	5	60.6	2
28.0	53.30	9	53.3	9	44.95	7	56.3	5	11.89	9	81.3	19	40.97	7	60.7	1
Aug. 7.0	53.42	12	52.3	10	45.05	10	56.7	4	12.03	14	79.3	20	41.07	10	60.8	1
17.0	53.57	15	51.2	11	45.18	13	57.0	3	12.21	18	77.2	21	41.20	13	60.7	1
26.9	53.75	18	49.9	13	45.34	16	57.1	1	12.43	22	75.0	22	41.36	16	60.5	2
Sept. 5.9	53.97	22	48.5	14	45.52	18	57.1	0	12.69	26	72.9	21	41.55	19	60.1	4
15.9	54.22	25	47.1	14	45.73	21	56.8	3	12.99	30	70.7	22	41.76	21	59.5	6
25.9	54.50	28	45.6	15	45.96	23	56.3	5	13.33	34	68.6	21	42.00	24	58.8	7
Oct. 5.8	54.80	30	44.1	15	46.22	26	55.5	8	13.70	37	66.6	20	42.26	26	57.9	9
15.8	55.13	33	42.6	15	46.51	29	54.5	10	14.10	40	64.8	18	42.55	29	56.7	12
25.8	55.48	35	41.1	15	46.81	30	53.3	12	14.53	43	63.1	17	42.86	31	55.3	14
Nov. 4.7	55.84	36	39.6	15	47.13	32	51.9	14	14.98	45	61.6	15	43.18	32	53.8	15
14.7	56.22	38	38.2	14	47.46	33	50.4	15	15.44	46	60.4	12	43.51	33	52.3	15
24.7	56.60	38	37.0	12	47.79	33	48.7	17	15.91	47	59.6	8	43.85	34	50.7	16
Dec. 4.7	56.97	37	36.0	10	48.11	32	46.9	18	16.37	46	59.1	5	44.18	33	49.1	16
14.6	57.32	35	35.2	8	48.42	31	45.1	18	16.81	44	58.9	2	44.50	32	47.5	16
24.6	57.64	32	34.6	6	48.70	28	43.4	17	17.21	40	59.1	2	44.79	29	46.0	15
34.6	57.93	29	34.3	3	48.95	25	41.8	16	17.56	35	59.7	6	45.05	26	44.7	13
Sec δ, Tan δ	1.166		+0.599		1.006		+0.110		1.506		+1.126		1.023		+0.216	
Mean Place	$52^s.750$		$48''.01$		$44^s.631$		$51''.78$		$11^s.344$		$76''.27$		$40^s.570$		$56''.07$	
$D'_\psi\,\alpha$, $D_\omega\,\alpha$	+0.01		+0.03		0.00		0.00		+0.02		+0.05		0.00		+0.01	
$D_\psi\,\delta$, $D_\omega\,\delta$	−0.3		+0.7		−0.3		+0.7		−0.3		+0 7		−0.3		+0.7	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	b^1 Carinæ. Mag. 5.1				κ Ursæ Majoris. Mag. 3.7				σ^2 Ursæ Majoris. Mag. 4.9				κ Cancri. Mag. 5.1			
	Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination N.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	8 54		−58 53		8 57		+47 30		9 2		+67 29		9 2		+11 1	
	s		″		s		″		s		″		s		″	
Jan. 0.6	50.52	25	5.4	38	38.87	32	16.6	8	42.97	51	29.2	17	59.66	24	26.1	12
10.6	50.77	17	9.2	38	39.19	26	17.4	11	43.48	41	30.9	21	59.90	20	24.9	11
20.5	50.94	8	13.0	38	39.45	19	18.5	14	43.89	29	33.0	23	60.10	15	23.8	9
30.5	51.02	0	16.8	37	39.64	12	19.9	16	44.18	17	35.3	25	60.25	9	22.9	6
Feb. 9.5	51.02	9	20.5	36	39.76	5	21.5	17	44.35	4	37.8	26	60.34	4	22.3	4
19.5	50.93	16	24.1	33	39.81	2	23.2	17	44.39	7	40.4	26	60.38	0	21.9	2
29.4	50.77	22	27.4	29	39.79	8	24.9	18	44.32	18	43.0	24	60.38	5	21.7	0
Mar. 10.4	50.55	28	30.3	26	39.71	14	26.7	17	44.14	27	45.4	22	60.33	8	21.7	2
20.4	50.27	32	32.9	21	39.57	18	28.4	14	43.87	35	47.6	19	60.25	11	21.9	3
30.4	49.95	35	35.0	17	39.39	21	29.8	12	43.52	40	49.5	15	60.14	13	22.2	3
Apr. 9.3	49.60	37	36.7	12	39.18	22	31.0	9	43.12	43	51.0	10	60.01	14	22.5	4
19.3	49.23	38	37.9	7	38.96	22	31.9	6	42.69	44	52.0	5	59.87	13	22.9	4
29.3	48.85	37	38.6	1	38.74	21	32.5	2	42.25	43	52.5	0	59.74	13	23.3	4
May 9.2	48.48	35	38.7	4	38.53	19	32.7	1	41.82	41	52.5	4	59.61	12	23.7	5
19.2	48.13	33	38.3	9	38.34	17	32.6	4	41.41	36	52.1	9	59.49	10	24.2	4
29.2	47.80	30	37.4	14	38.17	13	32.2	8	41.05	31	51.2	14	59.39	7	24.6	5
June 8.2	47.50	26	36.0	18	38.04	9	31.4	10	40.74	24	49.8	17	59.32	5	25.1	4
18.1	47.24	21	34.2	22	37.95	5	30.4	13	40.50	17	48.1	21	59.27	2	25.5	3
28.1	47.03	16	32.0	25	37.90	0	29.1	15	40.33	9	46.0	24	59.25	1	25.8	3
July 8.1	46.87	11	29.5	28	37.90	4	27.6	17	40.24	1	43.6	26	59.26	3	26.1	3
18.1	46.76	5	26.7	29	37.94	8	25.9	19	40.23	8	41.0	28	59.29	6	26.4	2
28.0	46.71	2	23.8	30	38.02	13	24.0	20	40.31	16	38.2	29	59.35	10	26.6	1
Aug. 7.0	46.73	9	20.8	30	38.15	17	22.0	21	40.47	24	35.3	29	59.45	12	26.7	0
17.0	46.82	16	17.8	29	38.32	21	19.9	21	40.71	32	32.4	30	59.57	15	26.7	2
26.9	46.98	22	14.9	26	38.53	25	17.8	22	41.03	39	29.4	29	59.72	17	26.5	4
Sept. 5.9	47.20	28	12.3	23	38.78	30	15.6	21	41.42	46	26.5	28	59.89	20	26.1	5
15.9	47.48	34	10.0	19	39.08	33	13.5	21	41.88	53	23.7	27	60.09	23	25.6	7
25.9	47.82	40	8.1	13	39.41	37	11.4	21	42.41	59	21.0	24	60.32	26	24.9	10
Oct. 5.8	48.22	45	6.8	8	39.78	40	9.3	19	43.00	65	18.6	21	60.58	28	23.9	11
15.8	48.67	48	6.0	1	40.18	42	7.4	17	43.65	69	16.5	18	60.86	30	22.8	13
25.8	49.15	49	5.9	5	40.60	44	5.7	15	44.34	72	14.7	14	61.16	32	21.5	15
Nov. 4.8	49.64	50	6.4	12	41.04	45	4.2	12	45.06	74	13.3	10	61.48	34	20.0	16
14.7	50.14	49	7.6	18	41.49	46	3.0	10	45.80	74	12.3	6	61.82	34	18.4	17
24.7	50.63	47	9.4	24	41.95	46	2.0	6	46.54	73	11.7	1	62.16	33	16.7	17
Dec. 4.7	51.10	42	11.8	29	42.41	43	1.4	2	47.27	70	11.6	5	62.49	32	15.0	17
14.6	51.52	37	14.7	33	42.84	40	1.2	2	47.97	64	12.1	10	62.81	30	13.3	16
24.6	51.89	29	18.0	35	43.24	36	1.4	5	48.61	56	13.1	14	63.11	26	11.7	14
34.6	52.18		21.5		43.60		1.9		49.17		14.5		63.37		10.3	
Sec δ, Tan δ	1.935		−1.657		1.480		+1.091		2.612		+2.413		1.019		+0.195	
Mean Place	49ˢ.158		22″.30		37ˢ.443		18″.83		40ˢ.028		33″.62		58ˢ.960		22″.38	
$D'_\psi \alpha$, $D_\omega \alpha$	−0.03		−0.08		+0.02		+0.05		+0.04		+0.12		0.00		+0.01	
$D_\psi \delta$, $D_\omega \delta$	−0.3		+0.7		−0.3		+0.7		−0.3		+0.7		−0.3		+0.7	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	λ Argûs. Mag. 2.2		θ Hydræ. Mag. 3.8		β Argûs. Mag. 1.8		83 Cancri. Mag. 6.6	
	Right Ascension.	Declination S.	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension.	Declination N.
	h m 9 4 s	° ′ −43 4 ″	h m 9 9 s	° ′ + 2 40 ″	h m 9 12 s	° ′ −69 20 ″	h m 9 14 s	° ′ +18 4 ″
Jan. 0.6	46.34	22.5	47.87	75.3	16.19	57.9	5.10	46.0
10.6	46.57 23	26.0 35	48.10 23	73.6 17	16.54 35	61.5 36	5.36 26	45.1 9
20.6	46.74 17	29.5 35	48.30 20	72.0 16	16.77 23	65.3 38	5.57 21	44.4 7
30.5	46.85 11	33.0 35	48.45 15	70.6 14	16.88 11	69.2 39	5.73 16	43.9 5
Feb. 9.5	46.90 5	36.4 34	48.54 9	69.5 11	16.88 0	73.1 39	5.84 11	43.7 2
	1	32	4	9	12	38	6	1
19.5	46.89	39.6	48.58	68.6	16.76	76.9	5.90	43.8
29.4	46.83 6	42.5 29	48.58 0	67.9 7	16.54 22	80.5 36	5.91 1	44.0 2
Mar. 10.4	46.71 12	45.1 26	48.54 4	67.4 5	16.22 32	83.8 33	5.87 4	44.3 3
20.4	46.55 16	47.4 23	48.46 8	67.1 3	15.82 40	86.7 29	5.79 8	44.8 5
30.4	46.36 19	49.2 18	48.36 10	67.0 1	15.35 47	89.2 25	5.69 10	45.4 6
	21	14	12	1	52	21	13	6
Apr. 9.3	46.15	50.6	48.24	67.1	14.83	91.3	5.56	46.0
19.3	45.92 23	51.5 9	48.11 13	67.3 2	14.27 56	92.9 16	5.42 14	46.5 5
29.3	45.68 24	52.0 5	47.97 14	67.6 3	13.70 57	94.0 11	5.28 14	47.0 5
May 9.3	45.45 23	52.0 0	47.84 13	68.0 4	13.12 58	94.5 5	5.15 13	47.5 5
19.2	45.23 22	51.6 4	47.73 11	68.5 5	12.55 57	94.5 0	5.03 12	47.9 4
	20	9	10	6	55	5	10	3
29.2	45.03	50.7	47.63	69.1	12.00	94.0	4.93	48.2
June 8.2	44.86 17	49.4 13	47.55 8	69.8 7	11.49 51	93.0 10	4.85 8	48.5 3
18.1	44.71 15	47.7 17	47.50 5	70.4 6	11.02 47	91.5 15	4.79 6	48.7 2
28.1	44.59 12	45.7 20	47.47 3	71.1 7	10.62 40	89.5 20	4.76 3	48.8 1
July 8.1	44.51 8	43.5 22	47.47 0	71.8 7	10.29 33	87.2 23	4.76 0	48.7 1
	4	24	3	7	25	27	2	2
18.1	44.47	41.1	47.50	72.5	10.04	84.5	4.78	48.5
28.0	44.47 0	38.5 26	47.55 5	73.1 6	9.88 16	81.6 29	4.84 6	48.3 2
Aug. 7.0	44.51 4	35.8 27	47.63 8	73.7 6	9.82 6	78.6 30	4.93 9	48.0 3
17.0	44.60 9	33.2 26	47.74 11	74.1 4	9.85 3	75.5 31	5.04 11	47.5 5
27.0	44.73 13	30.7 25	47.87 13	74.4 3	9.99 14	72.5 30	5.18 14	46.9 6
	17	23	16	1	24	29	17	8
Sept. 5.9	44.90	28.4	48.03	74.5	10.23	69.6	5.35	46.1
15.9	45.12 22	26.5 19	48.22 19	74.3 2	10.57 34	67.0 26	5.55 20	45.2 9
25.9	45.38 26	25.0 15	48.44 22	73.9 4	11.01 44	64.8 22	5.78 23	44.1 11
Oct. 5.8	45.68 30	24.0 10	48.69 25	73.3 6	11.53 52	63.1 17	6.04 26	42.8 13
15.8	46.01 33	23.6 4	48.97 28	72.4 9	12.12 59	61.9 12	6.33 29	41.4 14
	36	1	30	12	64	5	30	15
25.8	46.37	23.7	49.27	71.2	12.76	61.4	6.63	39.9
Nov. 4.8	46.75 38	24.4 7	49.58 31	69.7 15	13.44 68	61.5 1	6.96 33	38.3 16
14.7	47.14 39	25.7 13	49.90 32	68.0 17	14.13 69	62.3 8	7.30 34	36.6 17
24.7	47.53 39	27.5 18	50.23 33	66.2 18	14.81 68	63.8 15	7.65 35	35.0 16
Dec. 4.7	47.90 37	29.9 24	50.56 33	64.3 19	15.45 64	65.9 21	8.00 35	33.4 16
	35	28	31	19	59	26	33	15
14.7	48.25	32.7	50.87	62.4	16.04	68.5	8.33	31.9
24.6	48.57 32	35.9 32	51.16 29	60.4 20	16.55 51	71.6 31	8.65 32	30.6 13
34.6	48.83 26	39.3 34	51.42 26	58.6 18	16.96 41	75.0 34	8.93 28	29.5 11
Sec δ, Tan δ	1.369	−0.935	1.001	+0.047	2.836	−2.654	1.051	+0.326
Mean Place	$45^{s}.519$	37″.41	$47^{s}.242$	69″.98	$14^{s}.313$	76″.74	$4^{s}.363$	44″.14
$D'_{\psi}\alpha$, $D_{\omega}\alpha$	−0.02	−0.04	0.00	0.00	−0.05	−0.13	+0.01	+0.02
$D_{\psi}\delta$, $D_{\omega}\delta$	−0.3	+0.7	−0.3	+0.7	−0.3	+0.7	−0.3	+0.7

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	ι Argûs. Mag. 2.2				40 Lyncis. Mag. 3.3				θ Pyxidis. Mag. 4.9				α Hydræ. Mag. 2.2			
	Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination S.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	9 14		−58 54		9 15		+34 45		9 17		−25 35		9 23		− 8 16	
	s		″		s		″		s		″		s		″	
Jan. 0.6	45.12		2.6		42.88		53.5		36.20		15.4		16.34		28.2	
10.6	45.41	29	6.2	36	43.18	30	53.5	0	36.44	24	18.4	30	16.58	24	30.5	23
20.6	45.61	20	10.0	38	43.42	24	53.8	3	36.63	19	21.4	30	16.78	20	32.7	22
30.5	45.73	12	13.8	38	43.60	18	54.4	6	36.76	13	24.3	29	16.93	15	34.7	20
Feb. 9.5	45.77	4	17.6	38	43.73	13	55.2	8	36.84	8	27.0	27	17.03	10	36.5	18
19.5	45.73	4	21.3	37	43.80	7	56.2	10	36.87	3	29.5	25	17.09	6	38.1	16
29.4	45.61	12	24.7	34	43.81	1	57.4	12	36.86	1	31.7	22	17.09	0	39.4	13
Mar. 10.4	45.42	19	27.8	31	43.76	5	58.6	12	36.80	6	33.6	19	17.05	4	40.5	11
20.4	45.18	24	30.6	28	43.67	9	59.8	12	36.70	10	35.3	17	16.98	7	41.3	8
30.4	44.89	29	32.9	23	43.55	12	61.0	12	36.57	13	36.6	13	16.88	10	41.9	6
Apr. 9.3	44.56	33	34.8	19	43.40	15	62.1	11	36.42	15	37.5	9	16.76	12	42.3	4
19.3	44.21	35	36.2	14	43.23	17	63.0	9	36.26	16	38.1	6	16.63	13	42.4	1
29.3	43.85	36	37.2	10	43.06	17	63.7	7	36.10	16	38.3	2	16.50	13	42.3	1
May 9.3	43.49	36	37.6	4	42.90	16	64.2	5	35.94	16	38.2	1	16.37	13	42.0	3
19.2	43.13	36	37.5	1	42.75	15	64.4	2	35.79	15	37.8	4	16.24	13	41.5	5
29.2	42.80	33	36.8	7	42.62	13	64.4	0	35.65	14	37.0	8	16.13	11	40.8	7
June 8.2	42.49	31	35.7	11	42.52	10	64.2	2	35.53	12	35.9	11	16.04	9	40.0	8
18.1	42.21	28	34.1	16	42.44	8	63.7	5	35.44	9	34.6	13	15.97	7	39.0	10
28.1	41.98	23	32.1	20	42.40	4	63.0	7	35.37	7	33.0	16	15.93	4	37.9	11
July 8.1	41.80	18	29.8	23	42.39	1	62.2	8	35.33	4	31.2	18	15.91	2	36.8	11
18.1	41.67	13	27.2	26	42.41	2	61.2	10	35.32	1	29.4	18	15.92	1	35.6	12
28.0	41.59	8	24.4	28	42.47	6	60.0	12	35.34	2	27.4	20	15.95	3	34.4	12
Aug. 7.0	41.58	1	21.4	30	42.56	9	58.7	13	35.39	5	25.4	20	16.01	6	33.3	11
17.0	41.63	5	18.4	30	42.69	13	57.2	15	35.47	8	23.5	19	16.09	8	32.3	10
27.0	41.75	12	15.5	29	42.85	16	55.6	16	35.58	11	21.7	18	16.20	11	31.4	9
Sept. 5.9	41.94	19	12.8	27	43.04	19	53.9	17	35.73	15	20.2	15	16.35	15	30.7	7
15.9	42.20	26	10.4	24	43.27	23	52.2	17	35.92	19	18.9	13	16.53	18	30.3	4
25.9	42.52	32	8.4	20	43.53	26	50.4	18	36.14	22	18.0	9	16.74	21	30.2	1
Oct. 5.8	42.89	37	6.9	15	43.82	29	48.6	18	36.39	25	17.5	5	16.98	24	30.4	2
15.8	43.32	43	5.9	10	44.14	32	46.8	18	36.67	28	17.5	0	17.24	26	31.0	6
25.8	43.79	47	5.6	3	44.49	35	45.0	18	36.98	31	18.0	5	17.53	29	31.9	9
Nov. 4.8	44.28	49	5.9	3	44.86	37	43.3	17	37.31	33	19.0	10	17.84	31	33.2	13
14.7	44.79	51	6.9	10	45.25	39	41.7	16	37.65	34	20.4	14	18.16	32	34.8	16
24.7	45.29	50	8.5	16	45.65	40	40.3	14	37.99	34	22.3	19	18.49	33	36.7	19
Dec. 4.7	45.77	48	10.7	22	46.04	39	39.1	12	38.33	34	24.5	22	18.82	33	38.8	21
14.7	46.22	45	13.4	27	46.42	38	38.2	9	38.65	32	27.1	26	19.14	32	41.0	22
24.6	46.61	39	16.5	31	46.77	35	37.6	6	38.95	30	29.9	28	19.43	29	43.3	23
34.6	46.94	33	20.0	35	47.09	32	37.3	3	39.21	26	32.8	29	19.69	26	45.7	24
Sec δ, Tan δ	1.936		−1.658		1.217		+0.694		1.109		−0.479		1.011		−0.145	
Mean Place	43ˢ.970		20″.30		41ˢ.887		54″.94		35ˢ.627		27″.12		15ˢ.807		35″.88	
D′ψ α, Dω α	−0.03		−0.08		+0.01		+0.03		−0.01		−0.02		0.00		−0.01	
Dψ δ, Dω δ	−0.3		+0.7		−0.3		+0.7		−0.3		+0.7		−0.3		+0.6	

FOR THE UPPER TRANSIT AT WASHINGTON

Mean Solar Date.	*h* **Ursæ Majoris.** Mag. 3.8				*d* **Ursæ Majoris.** Mag. 4.6				*θ* **Ursæ Majoris.** Mag. 3.3				*ξ* **Leonis.** Mag. 5.1			
	Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination N.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	9 24		+63 26		9 26		+70 12		9 26		+52 4		9 27		+11 41	
	s		″		s		″		s		″		s		″	
Jan. 0.6	38.71	48	44.4	14	46.64	61	57.9	15	60.29	38	39.8	7	12.89	26	27.0	14
10.6	39.19	40	45.8	17	47.25	51	59.4	20	60.67	32	40.5	12	13.15	22	25.6	11
20.6	39.59	31	47.5	20	47.76	38	61.4	23	60.99	24	41.7	15	13.37	17	24.5	9
30.5	39.90	20	49.5	23	48.14	24	63.7	26	61.23	16	43.2	17	13.54	12	23.6	6
Feb. 9.5	40.10	10	51.8	25	48.38	11	66.3	27	61.39	9	44.9	19	13.66	6	23.0	4
19.5	40.20	1	54.3	25	48.49	2	69.0	27	61.48	1	46.8	20	13.72	2	22.6	2
29.5	40.19	10	56.8	24	48.47	15	71.7	27	61.49	6	48.8	21	13.74	2	22.4	0
Mar. 10.4	40.09	19	59.2	23	48.32	26	74.4	24	61.43	12	50.9	19	13.72	6	22.4	2
20.4	39.90	26	61.5	20	48.06	36	76.8	21	61.31	17	52.8	17	13.66	10	22.6	3
30.4	39.64	31	63.5	17	47.70	43	78.9	18	61.14	21	54.5	15	13.56	12	22.9	4
Apr. 9.3	39.33	35	65.2	12	47.27	48	80.7	13	60.93	24	56.0	12	13.44	12	23.3	5
19.3	38.98	36	66.4	8	46.79	50	82.0	8	60.69	25	57.2	9	13.32	13	23.8	4
29.3	38.62	36	67.2	4	46.29	50	82.8	3	60.44	24	58.1	4	13.19	13	24.2	5
May 9.3	38.26	35	67.6	1	45.79	49	83.1	2	60.20	23	58.5	1	13.06	12	24.7	5
19.2	37.91	32	67.5	6	45.30	45	82.9	7	59.97	21	58.6	3	12.94	10	25.2	5
29.2	37.59	27	66.9	10	44.85	40	82.2	12	59.76	17	58.3	7	12.84	8	25.7	4
June 8.2	37.32	22	65.9	14	44.45	33	81.0	17	59.59	14	57.6	10	12.76	6	26.1	4
18.2	37.10	16	64.5	18	44.12	26	79.3	20	59.45	10	56.6	14	12.70	4	26.5	3
28.1	36.94	10	62.7	21	43.86	18	77.3	23	59.35	6	55.2	16	12.66	1	26.8	3
July 8.1	36.84	4	60.6	24	43.68	9	75.0	26	59.29	1	53.6	19	12.65	1	27.1	2
18.1	36.80	3	58.2	26	43.59	1	72.4	29	59.28	4	51.7	21	12.66	4	27.3	1
28.0	36.83	10	55.6	28	43.60	10	69.5	31	59.32	8	49.6	22	12.70	6	27.4	0
Aug. 7.0	36.93	16	52.8	29	43.70	19	66.4	31	59.40	13	47.4	24	12.76	9	27.4	2
17.0	37.09	23	49.9	29	43.89	28	63.3	32	59.53	18	45.0	25	12.85	13	27.2	3
27.0	37.32	30	47.0	29	44.17	36	60.1	31	59.71	22	42.5	25	12.98	16	26.9	4
Sept. 5.9	37.62	36	44.1	29	44.53	45	57.0	31	59.93	27	40.0	26	13.14	18	26.5	6
15.9	37.98	42	41.2	28	44.98	53	53.9	29	60.20	32	37.4	25	13.32	21	25.9	9
25.9	38.40	48	38.4	26	45.51	60	51.0	27	60.52	36	34.9	25	13.53	24	25.0	11
Oct. 5.9	38.88	53	35.8	24	46.11	67	48.3	25	60.88	39	32.4	23	13.77	27	23.9	12
15.8	39.41	57	33.4	21	46.78	74	45.8	21	61.27	43	30.1	21	14.04	30	22.7	15
25.8	39.98	61	31.3	18	47.52	78	43.7	18	61.70	46	28.0	19	14.34	31	21.2	16
Nov. 4.8	40.59	64	29.5	14	48.30	81	41.9	13	62.16	49	26.1	16	14.65	33	19.6	17
14.7	41.23	65	28.1	9	49.11	83	40.6	9	62.65	50	24.5	12	14.98	34	17.9	18
24.7	41.88	65	27.2	5	49.94	82	39.7	3	63.15	49	23.3	8	15.32	34	16.1	18
Dec. 4.7	42.53	63	26.7	0	50.76	79	39.4	2	63.64	48	22.5	4	15.66	33	14.3	17
14.7	43.16	58	26.7	5	51.55	74	39.6	8	64.12	45	22.1	0	15.99	31	12.6	17
24.6	43.74	53	27.2	10	52.29	66	40.4	12	64.57	41	22.1	5	16.30	29	10.9	15
34.6	44.27		28.2		52.95		41.6		64.98		22.6		16.59		9.4	
Sec δ, Tan δ	2.237		+2.001		2.955		+2.780		1.627		+1.284		1.021		+0.207	
Mean Place	$36^{s}.359$		$50''.33$		$43^{s}.372$		$64''.39$		$58^{s}.762$		$44''.57$		$12^{s}.262$		$24''.11$	
$D'_{\psi}\alpha$, $D_{\omega}\alpha$	+0.03		+0.10		+0.05		+0.15		+0.02		+0.07		0.00		+0.01	
$D_{\psi}\delta$, $D_{\omega}\delta$	−0.3		+0.6		−0.3		+0.6		−0.3		+0.6		−0.3		+0.6	

FOR THE UPPER TRANSIT AT WASHINGTON.

ean Solar Date.	ψ Argûs. Mag. 3.6				10 Leonis Minoris. Mag. 4.6				o Leonis. Mag. 3.8				ζ Chamæleontis. Mag. 5.2			
	Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination S.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	9 27		−40 4		9 28		+36 47		9 36		+10 17		9 36		−80 32	
	s		″		s		″		s		″		s		″	
an. 0.6	14.50		37.9		51.22		17.4		27.92		38.6		34.20		24.8	
10.6	14.76	26	41.3	34	51.53	31	17.4	0	28.19	27	37.1	15	34.93	73	28.2	34
20.6	14.96	20	44.7	34	51.79	26	17.7	3	28.41	22	35.9	12	35.44	51	31.8	36
30.5	15.11	15	48.1	34	52.00	21	18.3	6	28.58	17	34.9	10	35.72	28	35.6	38
eb. 9.5	15.19	8	51.4	33	52.15	15	19.2	9	28.71	13	34.2	7	35.76	4	39.5	39
19.5	15.22	3	54.6	32	52.23	8	20.3	11	28.79	8	33.7	5	35.56	20	43.4	39
29.5	15.19	3	57.6	30	52.25	2	21.6	13	28.82	3	33.4	3	35.14	42	47.2	38
ar. 10.4	15.11	8	60.2	26	52.22	3	23.0	14	28.80	2	33.3	1	34.52	62	50.8	36
20.4	14.98	13	62.5	23	52.14	8	24.4	14	28.75	5	33.4	1	33.71	81	54.1	33
30.4	14.82	16	64.4	19	52.02	12	25.7	13	28.66	9	33.7	3	32.75	96	57.1	30
or. 9.3	14.64	18	65.9	15	51.87	15	26.9	12	28.55	11	34.0	3	31.65	110	59.7	26
19.3	14.44	20	67.0	11	51.71	16	27.9	10	28.43	12	34.4	4	30.45	120	61.8	21
29.3	14.24	20	67.6	6	51.54	17	28.7	8	28.31	12	34.9	5	29.18	127	63.5	17
ay 9.3	14.03	21	67.8	2	51.38	16	29.2	5	28.18	13	35.4	5	27.87	131	64.6	11
19.2	13.83	20	67.6	2	51.22	16	29.5	3	28.06	12	35.9	5	26.54	133	65.2	6
29.2	13.64	19	67.0	6	51.08	14	29.6	1	27.96	10	36.4	5	25.23	131	65.2	0
ne 8.2	13.47	17	66.0	10	50.97	11	29.4	2	27.87	9	36.9	5	23.97	126	64.7	5
18.2	13.33	14	64.6	14	50.88	9	28.9	5	27.80	7	37.3	4	22.79	118	63.7	10
28.1	13.21	12	62.8	18	50.82	6	28.2	7	27.76	4	37.7	4	21.72	107	62.2	15
ly 8.1	13.12	9	60.7	21	50.80	2	27.3	9	27.74	2	38.0	3	20.78	94	60.2	20
18.1	13.07	5	58.4	23	50.81	1	26.2	11	27.75	1	38.3	3	20.01	77	57.8	24
28.0	13.05	2	56.0	24	50.85	4	24.9	13	27.78	3	38.5	2	19.42	59	55.1	27
g. 7.0	13.07	2	53.5	25	50.93	8	23.4	15	27.84	6	38.5	0	19.04	38	52.2	29
17.0	13.13	6	51.0	25	51.04	11	21.8	16	27.93	9	38.4	1	18.88	16	49.2	30
27.0	13.23	10	48.7	23	51.19	15	20.1	17	28.04	11	38.2	2	18.95	7	46.1	31
pt. 5.9	13.37	14	46.5	22	51.37	18	18.3	18	28.18	14	37.8	4	19.25	30	43.1	30
15.9	13.56	19	44.6	19	51.59	22	16.4	19	28.35	17	37.2	6	19.79	54	40.3	28
25.9	13.79	23	43.1	15	51.84	25	14.4	20	28.56	21	36.4	8	20.54	75	37.8	25
t. 5.9	14.06	27	42.0	11	52.13	29	12.4	20	28.79	23	35.4	10	21.49	95	35.7	21
15.8	14.37	31	41.5	5	52.45	32	10.4	20	29.05	26	34.1	13	22.60	111	34.1	16
25.8	14.71	34	41.5	0	52.80	35	8.5	19	29.34	29	32.7	14	23.85	125	33.1	10
ov. 4.8	15.07	36	42.1	6	53.17	37	6.6	19	29.65	31	31.1	16	25.19	134	32.7	4
14.7	15.45	38	43.2	11	53.56	39	4.9	17	29.98	33	29.3	18	26.57	138	32.9	2
24.7	15.83	38	45.0	18	53.96	40	3.4	15	30.32	34	27.5	18	27.94	137	33.8	9
ec. 4.7	16.21	38	47.2	22	54.36	40	2.2	12	30.66	34	25.6	19	29.26	132	35.4	16
14.7	16.57	36	49.8	26	54.75	39	1.2	10	30.99	33	23.8	18	30.46	120	37.6	22
24.6	16.90	33	52.8	30	55.12	37	0.6	6	31.30	31	22.1	17	31.52	106	40.3	27
34.6	17.18	28	56.0	32	55.46	34	0.3	3	31.59	29	20.5	16	32.39	87	43.5	32
δ, Tan δ	1.307		−0.842		1.249		+0.748		1.016		+0.182		6.088		−6.005	
n Place	13ˢ.885		52″.87		50ˢ.225		19″.91		27ˢ.345		35″.66		30ˢ.596		45″.72	
a, Dω a	−0.01		−0.04		+0.01		+0.04		0.00		+0.01		−0.09		−0.32	
δ, Dω δ	−0.3		+0.6		−0.3		+0.6		−0.3		+0.6		−0.3		+0.6	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	θ Antliæ. Mag. 5.0				ε Leonis. Mag. 3.1				υ Ursæ Majoris. Mag. 3.9				υ Argûs. Mag. 3.2			
	Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination S.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	9 40		−27 21		9 40		+24 10		9 44		+59 26		9 44		−64 39	
	s		″		s		″		s		″		s		″	
Jan. 0.6	17.17		45.9		52.26		46.9		46.47		64.6		55.23		29.6	
10.6	17.43	26	48.9	30	52.55	29	46.2	7	46.94	47	65.6	10	55.61	38	33.1	35
20.6	17.64	21	51.9	30	52.79	24	45.7	5	47.33	39	67.0	14	55.90	29	36.8	37
30.5	17.80	16	54.9	30	52.99	20	45.5	2	47.64	31	68.8	18	56.10	20	40.7	39
Feb. 9.5	17.91	11	57.8	29	53.13	14	45.6	1	47.86	22	70.8	20	56.20	10	44.6	39
19.5	17.97	6	60.4	26	53.22	9	46.0	4	47.99	13	73.0	22	56.20	0	48.4	38
29.5	17.97	0	62.8	24	53.25	3	46.6	6	48.02	3	75.3	23	56.11	9	52.1	37
Mar. 10.4	17.93	4	64.9	21	53.24	1	47.3	7	47.97	5	77.7	24	55.94	17	55.6	35
20.4	17.85	8	66.7	18	53.19	5	48.1	8	47.84	13	80.0	23	55.70	24	58.8	32
30.4	17.74	11	68.2	15	53.10	9	49.0	9	47.65	19	82.0	20	55.39	31	61.6	28
Apr. 9.4	17.61	13	69.4	12	52.98	12	49.8	8	47.40	25	83.8	18	55.03	36	64.0	24
19.3	17.46	15	70.2	8	52.85	13	50.6	8	47.12	28	85.3	15	54.63	40	65.9	19
29.3	17.30	16	70.6	4	52.72	13	51.4	8	46.82	30	86.3	10	54.21	42	67.3	14
May 9.3	17.14	16	70.7	1	52.58	14	52.0	6	46.51	31	86.9	6	53.78	43	68.2	9
19.2	16.99	15	70.4	3	52.45	13	52.5	5	46.21	30	87.1	2	53.34	44	68.6	4
29.2	16.85	14	69.8	6	52.33	12	52.8	3	45.93	28	86.8	3	52.91	43	68.5	1
June 8.2	16.72	13	68.9	9	52.23	10	53.0	2	45.68	25	86.1	7	52.50	41	67.9	6
18.2	16.61	11	67.7	12	52.16	7	53.0	0	45.47	21	85.0	11	52.12	38	66.7	12
28.1	16.53	8	66.2	15	52.11	5	52.8	2	45.31	16	83.4	16	51.78	34	65.1	16
July 8.1	16.47	6	64.5	17	52.08	3	52.5	3	45.20	11	81.5	19	51.49	29	63.1	20
18.1	16.43	4	62.7	18	52.09	1	52.1	4	45.14	6	79.4	21	51.25	24	60.7	24
28.1	16.42	1	60.8	19	52.12	3	51.5	6	45.14	0	77.0	24	51.08	17	58.0	27
Aug. 7.0	16.45	3	58.8	20	52.18	6	50.7	8	45.19	5	74.4	26	50.99	9	55.1	29
17.0	16.51	6	56.9	19	52.27	9	49.8	9	45.30	11	71.7	27	50.97	2	52.1	30
27.0	16.60	9	55.1	18	52.39	12	48.8	10	45.47	17	68.8	29	51.03	6	49.1	30
Sept. 5.9	16.73	13	53.4	17	52.54	15	47.6	12	45.69	22	65.9	29	51.18	15	46.2	29
15.9	16.90	17	52.0	14	52.72	18	46.2	14	45.97	28	63.0	29	51.42	24	43.6	26
25.9	17.10	20	51.0	10	52.93	21	44.7	15	46.31	34	60.1	29	51.74	32	41.3	23
Oct. 5.9	17.33	23	50.3	7	53.17	24	43.1	16	46.71	40	57.4	27	52.13	39	39.4	19
15.8	17.60	27	50.1	2	53.45	28	41.4	17	47.15	44	54.8	26	52.60	47	38.0	14
25.8	17.90	30	50.4	3	53.76	31	39.6	18	47.64	49	52.4	24	53.12	52	37.2	8
Nov. 4.8	18.23	33	51.2	8	54.09	33	37.7	19	48.17	53	50.3	21	53.68	56	37.0	2
14.8	18.57	34	52.5	13	54.44	35	35.9	18	48.73	56	48.6	17	54.27	59	37.5	5
24.7	18.92	35	54.3	18	54.80	36	34.1	18	49.31	58	47.3	13	54.87	60	38.6	11
Dec. 4.7	19.27	35	56.5	22	55.16	36	32.5	16	49.89	58	46.4	9	55.46	59	40.4	18
14.7	19.61	34	59.0	25	55.52	36	31.1	14	50.46	57	46.1	3	56.01	55	42.8	24
24.6	19.93	32	61.7	27	55.86	34	29.9	12	51.00	54	46.2	1	56.51	50	45.6	28
34.6	20.21	28	64.6	29	56.17	31	28.9	10	51.49	49	46.8	6	56.94	43	48.9	33
Sec δ, Tan δ	1.126		−0.518		1.096		+0.449		1.968		+1.694		2.337		−2.112	
Mean Place	16ˢ.715		58″.20		51ˢ.538		47″.48		44ˢ.572		71″.62		54ˢ.185		49″.30	
D′ψ α, Dω α	−0.01		−0.03		+0.01		+0.02		+0.02		+0.09		−0.03		−0.12	
Dψ δ, Dω δ	−0.3		+0.6		−0.3		+0.6		−0.3		+0.6		−0.3		+0.6	

[Eph 12]

FOR THE UPPER TRANSIT AT WASHINGTON.

ean Solar Date.	**6 Sextantis.** Mag. 6.0				**μ Leonis.** Mag. 4.1				**Groombridge 1586.** Mag. 6.0				**19 Leonis Minoris.** Mag. 5.2			
	Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination N.	
	h m 9 46		° ′ − 3 49		h m 9 47		° ′ +26 24		h m 9 50		° ′ +73 17		h m 9 52		° ′ +41 28	
	s		″		s		″		s		″		s		″	
n. 0.6	48.46		43.4		46.39		77.5		36.19		46.2		19.00		26.1	
10.6	48.72	26	45.5	21	46.69	30	76.8	7	36.94	75	47.6	14	19.35	35	26.1	0
20.6	48.94	22	47.5	20	46.95	26	76.4	4	37.58	64	49.5	19	19.65	30	26.5	4
30.6	49.12	18	49.4	19	47.16	21	76.3	1	38.08	50	51.8	23	19.89	24	27.3	8
b. 9.5	49.25	13	51.0	16	47.31	15	76.5	2	38.43	35	54.4	26	20.07	18	28.4	11
19.5	49.33	8	52.4	14	47.41	10	77.0	5	38.62	19	57.2	28	20.19	12	29.8	14
29.5	49.36	3	53.5	11	47.45	4	77.7	7	38.65	3	60.0	28	20.24	5	31.3	15
ar.10.4	49.35	1	54.4	9	47.44	1	78.5	8	38.54	11	62.7	27	20.23	1	32.9	16
20.4	49.30	5	55.1	7	47.39	5	79.5	10	38.28	26	65.3	26	20.17	6	34.6	17
30.4	49.22	8	55.5	4	47.31	8	80.5	10	37.90	38	67.7	24	20.06	11	36.2	16
r. 9.4	49.12	10	55.7	2	47.19	12	81.4	9	37.43	47	69.7	20	19.92	14	37.6	14
19.3	49.00	12	55.7	0	47.06	13	82.3	9	36.89	54	71.3	16	19.76	16	38.9	13
29.3	48.88	12	55.5	2	46.92	14	83.1	8	36.31	58	72.4	11	19.58	18	39.9	10
ay 9.3	48.76	12	55.2	3	46.78	14	83.8	7	35.70	61	73.0	6	19.40	18	40.7	8
19.2	48.64	12	54.8	4	46.65	13	84.3	5	35.10	60	73.0	0	19.22	18	41.2	5
29.2	48.53	11	54.2	6	46.53	12	84.6	3	34.53	57	72.5	5	19.06	16	41.3	1
ne 8.2	48.44	9	53.5	7	46.42	11	84.7	1	34.00	53	71.4	11	18.92	14	41.1	2
18.2	48.37	7	52.7	8	46.34	8	84.7	0	33.54	46	69.9	15	18.80	12	40.6	5
28.1	48.31	6	51.9	8	46.28	6	84.5	2	33.16	38	68.0	19	18.71	9	39.8	8
ly 8.1	48.28	3	51.0	9	46.25	3	84.1	4	32.87	29	65.7	23	18.66	5	38.8	10
18.1	48.27	1	50.1	9	46.25	0	83.6	5	32.68	19	63.0	27	18.64	2	37.5	13
28.1	48.29	2	49.2	9	46.27	2	82.9	7	32.59	9	60.1	29	18.65	1	36.0	15
g. 7.0	48.33	4	48.4	8	46.32	5	82.0	9	32.60	1	57.0	31	18.70	5	34.3	17
17.0	48.40	7	47.7	7	46.40	8	80.9	11	32.71	11	53.7	33	18.78	8	32.4	19
27.0	48.49	9	47.1	6	46.51	11	79.7	12	32.94	23	50.4	33	18.90	12	30.3	21
pt. 5.9	48.62	13	46.7	4	46.66	15	78.3	14	33.27	33	47.0	34	19.06	16	28.1	22
15.9	48.78	16	46.5	2	46.84	18	76.8	15	33.71	44	43.7	33	19.26	20	25.9	22
25.9	48.96	18	46.6	1	47.05	21	75.2	16	34.25	54	40.5	32	19.50	24	23.6	23
t. 5.9	49.18	22	47.0	4	47.29	24	73.5	17	34.88	63	37.5	30	19.78	28	21.3	23
15.8	49.43	25	47.8	8	47.57	28	71.6	19	35.60	72	34.7	28	20.09	31	19.0	23
25.8	49.71	28	48.9	11	47.87	30	69.7	19	36.39	79	32.2	25	20.44	35	16.7	23
v. 4.8	50.01	30	50.2	13	48.20	33	67.8	19	37.25	86	30.1	21	20.82	38	14.6	21
14.8	50.33	32	51.8	16	48.55	35	66.0	18	38.16	91	28.5	16	21.22	40	12.7	19
24.7	50.66	33	53.7	19	48.92	37	64.2	18	39.11	95	27.4	11	21.64	42	11.0	17
c. 4.7	50.99	33	55.7	20	49.29	37	62.5	17	40.06	95	26.8	6	22.07	43	9.6	14
14.7	51.32	33	57.9	22	49.65	36	61.1	14	40.99	93	26.7	1	22.49	42	8.6	10
24.6	51.63	31	60.1	22	50.00	35	59.9	12	41.87	88	27.2	5	22.89	40	7.9	7
34.6	51.91	28	62.3	22	50.32	32	59.0	9	42.67	80	28.3	11	23.26	37	7.7	2
δ, Tan δ	1.002		−0.067		1.117		+0.497		3.480		+3.332		1.335		+0.884	
n Place	48ˢ.014		49″.64		45ˢ.669		78″.82		32ˢ.438		54″.76		17ˢ.972		30″.86	
α, Dᵤ α	0.00		0.00		+0.01		+0.03		+0.05		+0.19		+0.01		+0.05	
δ, Dᵤ δ	−0.3		+0.5		−0.3		+0.5		−0.3		+0.5		−0.3		+0.5	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	ϕ Argûs. Mag. 3.7				π Leonis. Mag. 4.9				η Leonis. Mag. 3.6				α Leonis. Mag. 1.3			
	Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination N.	
	h m 9 53		° ′ −54 8		h m 9 55		° ′ + 8 27		h m 10 2		° ′ +17 11		h m 10 3		° ′ +12 23	
	s		″		s		″		s		″		s		″	
Jan. 0.6	46.85		37.3		34.34		63.5		32.67		32.2		41.71		53.1	
10.6	47.18	33	40.7	34	34.62	28	61.9	16	32.97	30	30.9	13	42.00	29	51.7	14
20.6	47.44	26	44.3	36	34.85	23	60.5	14	33.22	25	30.0	9	42.25	25	50.5	12
30.6	47.64	20	48.0	37	35.04	19	59.3	12	33.43	21	29.3	7	42.45	20	49.5	10
Feb. 9.5	47.76	12	51.8	38	35.19	15	58.4	9	33.59	16	28.9	4	42.60	15	48.8	7
19.5	47.80	4	55.5	37	35.29	10	57.7	7	33.69	10	28.8	1	42.71	11	48.4	4
29.5	47.78	2	59.0	35	35.34	5	57.3	4	33.75	6	28.9	1	42.77	6	48.2	2
Mar. 10.4	47.69	9	62.3	33	35.34	0	57.2	1	33.76	1	29.2	3	42.78	1	48.2	0
20.4	47.55	14	65.2	29	35.30	4	57.2	0	33.73	3	29.7	5	42.75	3	48.4	2
30.4	47.36	19	67.8	26	35.23	7	57.3	1	33.66	7	30.3	6	42.68	7	48.8	4
Apr. 9.4	47.13	23	70.0	22	35.13	10	57.6	3	33.57	9	31.0	7	42.59	9	49.3	5
19.3	46.87	26	71.8	18	35.02	11	58.0	4	33.46	11	31.7	7	42.48	11	49.8	5
29.3	46.59	28	73.1	13	34.91	11	58.5	5	33.34	12	32.4	7	42.37	11	50.4	6
May 9.3	46.31	28	73.9	8	34.79	12	59.0	5	33.21	13	33.0	6	42.25	12	50.9	5
19.3	46.02	29	74.2	3	34.67	12	59.5	5	33.09	12	33.5	5	42.13	12	51.5	6
29.2	45.74	28	74.0	2	34.57	10	60.0	5	32.98	11	34.0	5	42.02	11	52.0	5
June 8.2	45.48	26	73.3	7	34.48	9	60.5	5	32.88	10	34.4	4	41.93	9	52.5	5
18.2	45.24	24	72.2	11	34.40	8	61.0	5	32.80	8	34.7	3	41.85	8	52.9	4
28.1	45.02	22	70.7	15	34.34	6	61.4	4	32.74	6	34.8	1	41.79	6	53.2	3
July 8.1	44.83	19	68.7	20	34.31	3	61.8	4	32.70	4	34.9	1	41.75	4	53.4	2
18.1	44.68	15	66.4	23	34.30	1	62.1	3	32.69	1	34.8	1	41.74	1	53.6	2
28.1	44.58	10	63.9	25	34.32	2	62.4	3	32.70	1	34.6	2	41.75	1	53.6	0
Aug. 7.0	44.53	5	61.2	27	34.36	4	62.5	1	32.74	4	34.2	4	41.78	3	53.5	1
17.0	44.54	1	58.4	28	34.43	7	62.5	0	32.80	6	33.7	5	41.84	6	53.3	2
27.0	44.60	6	55.6	28	34.52	9	62.4	1	32.89	9	33.0	7	41.93	9	52.9	4
Sept. 6.0	44.72	12	52.9	27	34.64	12	62.1	3	33.01	12	32.1	9	42.04	11	52.3	6
15.9	44.90	18	50.5	24	34.79	15	61.5	6	33.16	15	31.1	10	42.19	15	51.5	8
25.9	45.14	24	48.4	21	34.97	18	60.7	8	33.34	18	29.8	13	42.37	18	50.5	10
Oct. 5.9	45.44	30	46.7	17	35.19	22	59.7	10	33.56	22	28.4	14	42.58	21	49.3	12
15.8	45.79	35	45.5	12	35.44	25	58.5	12	33.81	25	26.8	16	42.82	24	47.9	14
25.8	46.19	40	44.9	6	35.72	28	57.1	14	34.09	28	25.1	17	43.10	28	46.3	16
Nov. 4.8	46.63	44	44.9	0	36.02	30	55.5	16	34.40	31	23.3	18	43.40	30	44.6	17
14.8	47.08	45	45.5	6	36.34	32	53.7	18	34.73	33	21.4	19	43.72	32	42.7	19
24.7	47.55	47	46.7	12	36.68	34	51.8	19	35.08	35	19.5	19	44.06	34	40.8	19
Dec. 4.7	48.02	47	48.5	18	37.02	34	49.8	20	35.43	35	17.6	19	44.41	35	38.8	20
14.7	48.47	45	50.9	24	37.35	33	47.9	19	35.78	35	15.8	18	44.75	34	36.9	19
24.7	48.88	41	53.8	29	37.67	32	46.0	19	36.12	34	14.1	17	45.08	33	35.1	18
34.6	49.24	36	57.0	32	37.97	30	44.3	17	36.43	31	12.7	14	45.38	30	33.5	16
Sec δ, Tan δ	1.707		−1.384		1.011		+0.149		1.047		+0.309		1.024		+0.220	
Mean Place	46ˢ.252		55″.58		33ˢ.858		60″.67		32ˢ.132		31″.94		41ˢ.230		51″.63	
$D'_\psi \alpha$, $D_\omega \alpha$	−0.02		−0.08		0.00		+0.01		0.00		+0.02		0.00		+0.01	
$D_\psi \delta$, $D_\omega \delta$	−0.3		+0.5		−0.3		+0.5		−0.3		+0.5		−0.3		+0.5	

FOR THE UPPER TRANSIT AT WASHINGTON.

an Solar Date.	λ Hydræ. Mag. 3.8				q Velorum. Mag. 4.1				32 Ursæ Majoris. Mag. 5.7				λ Ursæ Majoris. Mag. 3.5			
	Right Ascension.		Declination S.		Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination N.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	10 6		−11 54		10 11		−41 40		10 11		+65 32		10 11		+43 20	
	s		″		s		″		s		″		s		″	
n. 0.6	18.20	28	59.0	25	2.63	31	52.2	33	41.75	58	42.7	8	48.73	37	69.2	1
10.6	18.48	23	61.5	24	2.94	25	55.5	33	42.33	50	43.5	14	49.10	33	69.1	3
20.6	18.71	19	63.9	23	3.19	20	58.8	34	42.83	42	44.9	18	49.43	27	69.4	8
30.6	18.90	14	66.2	21	3.39	15	62.2	34	43.25	31	46.7	22	49.70	21	70.2	11
b. 9.5	19.04	10	68.3	19	3.54	9	65.6	34	43.56	20	48.9	25	49.91	14	71.3	14
19.5	19.14	5	70.2	17	3.63	3	69.0	31	43.76	9	51.4	26	50.05	8	72.7	16
29.5	19.19	0	71.9	14	3.66	3	72.1	29	43.85	2	54.0	26	50.13	1	74.3	18
ar.10.5	19.19	4	73.3	11	3.63	7	75.0	26	43.83	11	56.6	25	50.14	4	76.1	18
20.4	19.15	7	74.4	9	3.56	11	77.6	23	43.72	20	59.1	24	50.10	9	77.9	18
30.4	19.08	9	75.3	6	3.45	14	79.9	19	43.52	28	61.5	21	50.01	13	79.7	16
pr. 9.4	18.99	11	75.9	4	3.31	17	81.8	15	43.24	33	63.6	18	49.88	16	81.3	14
19.3	18.88	12	76.3	1	3.14	19	83.3	11	42.91	36	65.4	13	49.72	18	82.7	12
29.3	18.76	12	76.4	1	2.95	19	84.4	7	42.55	39	66.7	9	49.54	18	83.9	9
ay 9.3	18.64	12	76.3	3	2.76	20	85.1	3	42.16	39	67.6	4	49.36	18	84.8	6
19.3	18.52	11	76.0	5	2.56	19	85.4	2	41.77	38	68.0	1	49.18	17	85.4	3
29.2	18.41	10	75.5	7	2.37	18	85.2	6	41.39	35	67.9	6	49.01	16	85.7	1
ne 8.2	18.31	9	74.8	9	2.19	17	84.6	10	41.04	31	67.3	10	48.85	13	85.6	4
18.2	18.22	8	73.9	10	2.02	14	83.6	14	40.73	26	66.3	15	48.72	11	85.2	7
28.2	18.14	5	72.9	11	1.88	13	82.2	17	40.47	21	64.8	19	48.61	8	84.5	10
ly 8.1	18.09	3	71.8	12	1.75	10	80.5	19	40.26	15	62.9	22	48.53	5	83.5	13
18.1	18.06	1	70.6	12	1.65	6	78.6	22	40.11	9	60.7	26	48.48	1	82.2	16
28.1	18.05	2	69.4	11	1.59	3	76.4	24	40.02	2	58.1	28	48.47	2	80.6	18
ug. 7.0	18.07	4	68.3	11	1.56	0	74.0	24	40.00	5	55.3	30	48.49	6	78.8	20
17.0	18.11	7	67.2	10	1.56	5	71.6	23	40.05	12	52.3	31	48.55	10	76.8	22
27.0	18.18	10	66.2	9	1.61	9	69.3	22	40.17	20	49.2	32	48.65	13	74.6	23
ept. 6.0	18.28	14	65.3	6	1.70	14	67.1	21	40.37	27	46.0	33	48.78	17	72.3	24
15.9	18.42	17	64.7	3	1.84	19	65.0	18	40.64	34	42.7	32	48.95	22	69.9	25
25.9	18.59	21	64.4	0	2.03	23	63.2	13	40.98	41	39.5	31	49.17	26	67.4	26
ct. 5.9	18.80	24	64.4	4	2.26	28	61.9	9	41.39	48	36.4	30	49.43	30	64.8	25
15.9	19.04	27	64.8	7	2.54	32	61.0	4	41.87	54	33.4	27	49.73	34	62.3	24
25.8	19.31	29	65.5	11	2.86	36	60.6	2	42.41	60	30.7	24	50.07	38	59.9	23
ov. 4.8	19.60	32	66.6	15	3.22	38	60.8	7	43.01	64	28.3	20	50.45	40	57.6	21
14.8	19.92	33	68.1	18	3.60	39	61.5	13	43.65	67	26.3	16	50.85	42	55.5	19
24.7	20.25	34	69.9	21	3.99	40	62.8	18	44.32	68	24.7	11	51.27	44	53.6	16
ec. 4.7	20.59	33	72.0	23	4.39	39	64.6	23	45.00	68	23.6	6	51.71	43	52.0	12
14.7	20.92	32	74.3	24	4.78	37	66.9	28	45.68	66	23.0	0	52.14	42	50.8	8
24.7	21.24	30	76.7	25	5.15	34	69.7	31	46.34	62	23.0	5	52.56	40	50.0	3
34.6	21.54		79.2		5.49		72.8		46.96		23.5		52.96		49.7	
δ, Tan δ	1.022		−0.211		1.339		−0.890		2.416		+2.199		1.375		+0.944	
n Place	$17^{s}.880$		67″.28		$2^{s}.322$		68″.31		$39^{s}.468$		52″.18		$47^{s}.741$		75″.44	
a, $D_{10}\,a$	0.00		−0.01		−0.01		−0.05		+0.03		+0.13		+0.01		+0.06	
δ, $D_{10}\,\delta$	−0.3		+0.5		−0.4		+0.5		−0.4		+0.5		−0.4		+0.5	

Mean Solar Date.	**ζ Leonis.** Mag. 3.6				**γ Leonis *pr.*** Mag. 2.6				**μ Ursæ Majoris.** Mag. 3.2				**30 H. Ursæ Majoris.** Mag. 4.9			
	Right Ascension.		**Declination N.**		**Right Ascension.**		**Declination N.**		**Right Ascension.**		**Declination N.**		**Right Ascension.**		**Declination N.**	
	h m 10 11		° ′ +23 51		h m 10 15		° ′ +20 16		h m 10 17		° ′ +41 56		h m 10 17		° ′ +66 0	
	s		″		s		″		s		″		s		″	
Jan. 0.7	48.51		20.6		7.90		72.3		6.44		26.6		50.63		32.7	
10.6	48.82	31	19.6	10	8.21	31	71.2	11	6.81	37	26.4	2	51.23	60	33.6	9
20.6	49.10	28	18.9	7	8.48	27	70.4	8	7.14	33	26.6	2	51.75	52	34.9	13
30.6	49.33	23	18.6	3	8.70	22	69.8	6	7.41	27	27.3	7	52.19	44	36.7	18
Feb. 9.5	49.50	17	18.6	0	8.88	18	69.5	3	7.62	21	28.3	10	52.52	33	38.9	22
19.5	49.62	12	18.9	3	9.00	12	69.5	0	7.77	15	29.6	13	52.73	21	41.3	24
29.5	49.68	6	19.4	5	9.07	7	69.8	3	7.85	8	31.1	15	52.84	11	43.9	26
Mar. 10.5	49.70	2	20.1	7	9.09	2	70.3	5	7.87	2	32.8	17	52.84	0	46.6	27
20.4	49.68	2	21.0	9	9.07	2	71.0	7	7.84	3	34.6	18	52.73	11	49.2	26
30.4	49.62	6	21.9	9	9.01	6	71.8	8	7.76	8	36.4	18	52.53	20	51.6	24
Apr. 9.4	49.52	10	22.9	10	8.93	8	72.6	8	7.64	12	38.0	16	52.26	27	53.8	22
19.4	49.40	12	23.8	9	8.83	10	73.4	8	7.49	15	39.5	15	51.93	33	55.6	18
29.3	49.28	12	24.7	9	8.71	12	74.2	8	7.32	17	40.7	12	51.56	37	57.0	14
May 9.3	49.16	12	25.4	7	8.58	13	74.9	7	7.14	18	41.6	9	51.17	39	58.0	10
19.3	49.03	13	26.0	6	8.46	12	75.5	6	6.96	18	42.3	7	50.77	40	58.4	4
29.2	48.91	12	26.5	5	8.35	11	76.0	5	6.80	16	42.6	3	50.38	39	58.4	0
June 8.2	48.81	10	26.8	3	8.25	10	76.4	4	6.65	15	42.6	0	50.02	36	57.9	5
18.2	48.72	9	26.9	1	8.16	9	76.6	2	6.52	13	42.3	3	49.70	32	56.9	10
28.2	48.65	7	26.9	0	8.09	7	76.7	1	6.41	11	41.7	6	49.42	28	55.4	15
July 8.1	48.60	5	26.7	2	8.04	5	76.6	1	6.33	8	40.7	10	49.19	23	53.6	18
18.1	48.57	3	26.3	4	8.02	2	76.4	2	6.28	5	39.5	12	49.02	17	51.4	22
28.1	48.57	0	25.7	6	8.02	0	76.0	4	6.26	2	38.0	15	48.92	10	48.8	26
Aug. 7.0	48.60	3	25.0	7	8.05	3	75.5	5	6.27	1	36.3	17	48.88	4	46.0	28
17.0	48.65	5	24.1	9	8.10	5	74.8	7	6.32	5	34.4	19	48.92	4	43.0	30
27.0	48.74	9	23.0	11	8.18	8	73.9	9	6.41	9	32.3	21	49.03	11	39.8	32
Sept. 6.0	48.86	12	21.7	13	8.29	11	72.8	11	6.54	13	30.0	23	49.21	18	36.5	33
15.9	49.01	15	20.2	15	8.43	14	71.5	13	6.70	16	27.6	24	49.47	26	33.2	33
25.9	49.19	18	18.6	16	8.60	17	70.1	14	6.91	21	25.1	25	49.80	33	30.0	32
Oct. 5.9	49.40	21	16.9	17	8.81	21	68.5	16	7.16	25	22.6	25	50.20	40	26.8	32
15.9	49.65	25	15.0	19	9.06	25	66.7	18	7.45	29	20.1	25	50.67	47	23.8	30
25.8	49.94	29	13.0	20	9.34	28	64.8	19	7.78	33	17.6	25	51.21	54	21.0	28
Nov. 4.8	50.25	31	11.0	20	9.64	30	62.8	20	8.14	36	15.3	23	51.81	60	18.5	25
14.8	50.59	34	9.0	20	9.97	33	60.8	20	8.53	39	13.1	22	52.45	64	16.4	21
24.7	50.95	36	7.0	20	10.32	35	58.8	20	8.95	42	11.2	19	53.12	67	14.8	16
Dec. 4.7	51.31	36	5.1	19	10.68	36	56.9	19	9.37	42	9.6	16	53.81	69	13.6	12
14.7	51.68	37	3.4	17	11.04	36	55.1	18	9.80	43	8.3	13	54.51	70	12.9	7
24.7	52.03	35	2.0	14	11.38	34	53.5	16	10.22	42	7.4	9	55.19	68	12.8	1
34.6	52.36	33	0.8	12	11.71	33	52.2	13	10.61	39	6.9	5	55.82	63	13.3	5
Sec δ, Tan δ	1.093		+0.442		1.066		+0.370		1.344		+0.898		2.461		+2.248	
Mean Place	$47^{\mathrm{s}}.926$		$22''.47$		$7^{\mathrm{s}}.380$		$73''.41$		$5^{\mathrm{s}}.516$		$32''.93$		$48^{\mathrm{s}}.349$		$42''.78$	
$D'_{\psi}\alpha$, $D_{\omega}\alpha$	+0.01		+0.03		0.00		+0.02		+0.01		+0.05		+0.03		+0.14	
$D_{\psi}\delta$, $D_{\omega}\delta$	−0.4		+0.5		−0.4		+0.4		−0.4		+0.4		−0.4		+0.4	

[Eph 12]

FOR THE UPPER TRANSIT AT WASHINGTON.

'ean Solar Date.	μ Hydræ. Mag. 4.1				31 Leonis Minoris. Mag. 4.4				α Antliæ. Mag. 4.4				36 Ursæ Majoris. Mag. 4.8			
	Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination N.	
	h m 10 21		° ′ −16 23		h m 10 22		° ′ +37 9		h m 10 23		° ′ −30 36		h m 10 25		° ′ +56 25	
	s		″		s		″		s		″		s		″	
n. 0.7	50.25		2.8		48.76		24.7		7.59		57.7		1.73		46.4	
10.6	50.54	29	5.4	26	49.11	35	24.3	4	7.89	30	60.6	29	2.20	47	46.7	3
20.6	50.79	25	7.9	25	49.42	31	24.3	0	8.14	25	63.6	30	2.61	41	47.6	9
30.6	50.99	20	10.4	25	49.68	26	24.6	3	8.35	21	66.7	31	2.96	35	48.9	13
:b. 9.5	51.15	16	12.8	24	49.89	21	25.3	7	8.51	16	69.7	30	3.24	28	50.6	17
19.5	51.26	11	15.0	22	50.04	15	26.3	10	8.62	11	72.6	29	3.43	19	52.6	20
29.5	51.32	6	16.9	19	50.12	8	27.6	13	8.67	5	75.3	27	3.53	10	54.8	22
ır.10.5	51.34	2	18.6	17	50.15	3	29.0	14	8.68	1	77.8	25	3.55	2	57.1	23
20.4	51.32	2	20.0	14	50.13	2	30.5	15	8.65	3	80.0	22	3.50	5	59.5	24
30.4	51.26	6	21.2	12	50.06	7	32.1	16	8.57	8	81.8	18	3.39	11	61.8	23
)r. 9.4	51.18	8	22.1	9	49.96	10	33.6	15	8.47	10	83.3	15	3.22	17	63.8	20
19.4	51.08	10	22.7	6	49.83	13	35.0	14	8.35	12	84.5	12	3.00	22	65.6	18
29.3	50.96	12	23.0	3	49.69	14	36.2	12	8.21	14	85.3	8	2.75	25	67.1	15
ıy 9.3	50.84	12	23.0	0	49.53	16	37.2	10	8.07	14	85.8	5	2.49	26	68.2	11
19.3	50.72	12	22.8	2	49.37	16	37.9	7	7.92	15	85.9	1	2.22	27	68.8	6
29.2	50.60	12	22.4	4	49.22	15	38.3	4	7.77	15	85.7	2	1.96	26	69.0	2
ne 8.2	50.49	11	21.8	6	49.08	14	38.4	1	7.63	14	85.1	6	1.72	24	68.8	2
18.2	50.39	10	21.0	8	48.96	12	38.2	2	7 50	13	84.2	9	1.50	22	68.1	7
28.2	50.31	8	20.0	10	48.86	10	37.8	4	7.39	11	83.0	12	1.31	19	67.0	11
ly 8.1	50.24	7	18.8	12	48.79	7	37.1	7	7.30	9	81.6	14	1.16	15	65.6	14
18.1	50.19	5	17.5	13	48.74	5	36.1	10	7.23	7	79.9	17	1.05	11	63.8	18
28.1	50.17	2	16.2	13	48.72	2	34.9	12	7.18	5	78.1	18	0.99	6	61.6	22
ıg. 7.1	50.17	0	14.9	13	48.74	2	33.4	15	7.15	3	76.2	19	0.97	2	59.2	24
17.0	50.19	2	13.6	13	48.78	4	31.7	17	7.16	1	74.3	19	1.00	3	56.6	26
27.0	50.25	6	12.4	12	48.86	8	29.9	18	7.21	5	72.4	19	1.08	8	53.8	28
pt. 6.0	50.34	9	11.3	11	48.97	11	27.9	20	7.29	8	70.6	18	1.22	14	50.9	29
15.9	50.46	12	10.5	8	49.12	15	25.7	22	7.41	12	69.0	16	1.41	19	47.9	30
25.9	50.62	16	10.0	5	49.31	19	23.4	23	7.57	16	67.7	13	1.65	24	44.8	31
:t. 5.9	50.81	19	9.7	3	49.54	23	21.0	24	7.77	20	66.8	9	1.95	30	41.8	30
15.9	51.04	23	9.8	1	49.81	27	18.6	24	8.02	25	66.3	5	2.31	36	38.8	30
25.8	51.30	26	10.3	5	50.11	30	16.2	24	8.30	28	66.3	0	2.71	40	36.0	28
)v. 4.8	51.59	29	11.3	10	50.45	34	13.8	24	8.62	32	66.7	4	3.16	45	33.5	25
14.8	51.91	32	12.6	13	50.82	37	11.6	22	8.96	34	67.6	9	3.65	49	31.3	22
24.8	52.24	33	14.3	17	51.21	39	9.6	20	9.32	36	69.1	15	4.17	52	29.4	19
:c. 4.7	52.58	34	16.3	20	51.61	40	7.8	18	9.68	36	71.0	19	4.71	54	27.9	15
14.7	52.93	35	18.6	23	52.02	41	6.4	14	10.04	36	73.2	22	5.25	54	26.9	10
24.7	53.26	33	21.1	25	52.42	40	5.3	11	10.39	35	75.8	26	5.78	53	26.4	5
34.6	53.56	30	23.6	25	52.79	37	4.5	8	10.71	32	78.7	29	6.27	49	26.4	0
δ, Tan δ	1.042		−0.294		1.255		+0.758		1.162		−0.592		1.808		+1.507	
n Place	$50^{s}.034$		$12''.08$		$47^{s}.981$		$30''.35$		$7^{s}.403$		$71''.01$		$0^{s}.266$		$55''.72$	
a, $D_\omega a$	0.00		−0.02		+0.01		+0.05		−0.01		−0.04		+0.02		+0.09	
ʃ, $D_\omega \delta$	−0.4		+0.4		−0.4		+0.4		−0.4		+0.4		−0.4		+0.4	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	9 H. Draconis. Mag. 5.0				ρ Leonis. Mag. 3.8				33 Sextantis. Mag. 6.4				41 Leonis Minoris. Mag. 5.0			
	Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination N.	
	h m 10 27		° ′ +76 9		h m 10 28		° ′ + 9 45		h m 10 36		° ′ − 1 16		h m 10 38		° ′ +23 38	
	s		″		s		″		s		″		s		″	
Jan. 0.7	42.97	96	48.8	11	11.10	30	36.6	16	55.80	29	38.0	22	38.50	32	54.9	12
10.6	43.93	84	49.9	16	11.40	26	35.0	15	56.09	26	40.2	20	38.82	29	53.7	8
20.6	44.77	70	51.5	21	11.66	22	33.5	12	56.35	23	42.2	18	39.11	25	52.9	5
30.6	45.47	53	53.6	24	11.88	18	32.3	9	56.58	18	44.0	16	39.36	20	52.4	2
Feb. 9.6	46.00	36	56.0	28	12.06	13	31.4	6	56.76	13	45.6	13	39.56	15	52.2	2
19.5	46.36	17	58.8	29	12.19	8	30.8	4	56.89	8	46.9	11	39.71	10	52.4	5
29.5	46.53	1	61.7	29	12.27	3	30.4	1	56.97	3	48.0	8	39.81	5	52.9	7
Mar. 10.5	46.52	19	64.6	28	12.30	1	30.3	1	57.00	0	48.8	6	39.86	0	53.6	9
20.4	46.33	34	67.4	27	12.29	4	30.4	2	57.00	3	49.4	3	39.86	4	54.5	10
30.4	45.99	48	70.1	23	12.25	7	30.6	4	56.97	6	49.7	1	39.82	7	55.5	10
Apr. 9.4	45.51	59	72.4	20	12.18	9	31.0	5	56.91	8	49.8	0	39.75	9	56.5	10
19.4	44.92	67	74.4	15	12.09	10	31.5	5	56.83	10	49.8	2	39.66	11	57.5	10
29.3	44.25	72	75.9	10	11.99	11	32.0	6	56.73	11	49.6	3	39.55	12	58.5	9
May 9.3	43.53	74	76.9	4	11.88	11	32.6	6	56.62	11	49.3	4	39.43	13	59.4	8
19.3	42.79	73	77.3	1	11.77	10	33.2	5	56.51	10	48.9	5	39.30	12	60.2	6
29.3	42.06	71	77.2	6	11.67	10	33.7	5	56.41	9	48.4	6	39.18	11	60.8	4
June 8.2	41.35	65	76.6	12	11.57	9	34.2	5	56.32	9	47.8	6	39.07	10	61.2	2
18.2	40.70	57	75.4	16	11.48	7	34.7	4	56.23	8	47.2	7	38.97	8	61.4	1
28.2	40.13	49	73.8	21	11.41	5	35.1	3	56.15	6	46.5	7	38.89	7	61.5	1
July 8.1	39.64	39	71.7	25	11.36	3	35.4	3	56.09	4	45.8	6	38.82	5	61.4	4
18.1	39.25	28	69.2	29	11.33	2	35.7	2	56.05	2	45.2	7	38.77	2	61.0	5
28.1	38.97	16	66.3	31	11.31	1	35.9	0	56.03	0	44.5	6	38.75	0	60.5	7
Aug. 7.1	38.81	4	63.2	33	11.32	4	35.9	1	56.03	2	43.9	4	38.75	3	59.8	10
17.0	38.77	9	59.9	35	11.36	6	35.8	3	56.05	5	43.5	3	38.78	6	58.8	11
27.0	38.86	22	56.4	36	11.42	9	35.5	5	56.10	7	43.2	2	38.84	9	57.7	13
Sept. 6.0	39.08	35	52.8	36	11.51	12	35.0	7	56.17	11	43.0	0	38.93	11	56.4	15
16.0	39.43	47	49.2	35	11.63	16	34.3	9	56.28	14	43.0	3	39.04	15	54.9	17
25.9	39.90	60	45.7	34	11.79	19	33.4	11	56.42	18	43.3	6	39.19	19	53.2	18
Oct. 5.9	40.50	72	42.3	32	11.98	22	32.3	13	56.60	21	43.9	8	39.38	23	51.4	20
15.9	41.22	83	39.1	29	12.20	26	31.0	16	56.81	25	44.7	11	39.61	26	49.4	21
25.8	42.05	92	36.2	25	12.46	29	29.4	18	57.06	28	45.8	14	39.87	29	47.3	22
Nov. 4.8	42.97	100	33.7	21	12.75	31	27.6	19	57.34	30	47.2	17	40.16	33	45.1	22
14.8	43.97	106	31.6	17	13.06	33	25.7	20	57.64	33	48.9	19	40.49	35	42.9	21
24.8	45.03	110	29.9	11	13.39	34	23.7	20	57.97	33	50.8	20	40.84	36	40.8	20
Dec. 4.7	46.13	110	28.8	5	13.73	35	21.7	20	58.30	34	52.8	22	41.20	37	38.8	19
14.7	47.23	107	28.3	1	14.08	33	19.7	20	58.64	34	55.0	22	41.57	36	36.9	16
24.7	48.30	101	28.4	7	14.41	32	17.7	18	58.98	31	57.2	22	41.93	34	35.3	14
34.7	49.31		29.1		14.73		15.9		59.29		59.4		42.27		33.9	
Sec δ, Tan δ	4.182		+4.061		1.015		+0.172		1.000		−0.021		1.092		+0.438	
Mean Place	38^s.820		60″.32		10^s.751		35″.26		55^s.577		42″.51		38^s.040		57″.87	
$D'_\psi a$, $D_\omega a$	+0.04		+0.25		0.00		+0.01		0.00		0.00		0.00		+0.03	
$D_\psi \delta$, $D_\omega \delta$	−0.4		+0.4		−0.4		+0.4		−0.4		+0.4		−0.4		+0.3	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	θ Argûs. Mag. 3.0				42 Leonis Minoris. Mag. 5.4				η Argûs. Var. 1.6–6.6				μ Argûs. Mag. 2.8			
	Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination S.	
	h m 10 39 s		° ′ −63 55 ″		h m 10 40 s		° ′ +31 8 ″		h m 10 41 s		° ′ −59 12 ″		h m 10 42 s		° ′ −48 57 ″	
Jan. 0.7	49.04		40.6		59.06		40.8		38.75		58.1		58.94		1.0	
10.6	49.51	47	43.7	31	59.41	35	39.9	9	39.18	43	61.1	30	59.31	37	4.0	30
20.6	49.92	41	47.1	34	59.72	31	39.4	5	39.55	37	64.5	34	59.63	32	7.3	33
30.6	50.24	32	50.7	36	59.98	26	39.3	1	39.85	30	68.1	36	59.89	26	10.8	35
Feb. 9.6	50.48	24	54.5	38	60.20	22	39.6	3	40.07	22	71.9	38	60.09	20	14.4	36
		14		39		16		6		14		38		14		35
19.5	50.62		58.4		60.36		40.2		40.21		75.7		60.23		17.9	
29.5	50.68	6	62.2	38	60.46	10	41.1	9	40.28	7	79.4	37	60.30	7	21.4	35
Mar. 10.5	50.65	3	65.9	37	60.51	5	42.3	12	40.27	1	83.0	36	60.31	1	24.7	33
20.4	50.54	11	69.4	35	60.52	1	43.6	13	40.19	8	86.4	34	60.27	4	27.7	30
30.4	50.37	17	72.7	33	60.48	4	44.9	13	40.05	14	89.5	31	60.18	9	30.5	28
		24		29		8		14		19		28		13		24
Apr. 9.4	50.13		75.6		60.40		46.3		39.86		92.3		60.05		32.9	
19.4	49.84	29	78.1	25	60.29	11	47.6	13	39.63	23	94.7	24	59.89	16	34.9	20
29.3	49.51	33	80.1	20	60.17	12	48.8	12	39.36	27	96.6	19	59.70	19	36.6	17
May 9.3	49.15	36	81.7	16	60.04	13	49.8	10	39.07	29	98.1	15	59.50	20	37.8	12
19.3	48.77	38	82.8	11	59.90	14	50.6	8	38.76	31	99.1	10	59.28	22	38.5	7
		39		6		13		6		32		5		22		3
29.3	48.38		83.4		59.77		51.2		38.44		99.6		59.06		38.8	
June 8.2	47.99	39	83.5	1	59.64	13	51.6	4	38.13	31	99.6	0	58.84	22	38.6	2
18.2	47.62	37	83.0	5	59.53	11	51.7	1	37.82	31	99.1	5	58.62	22	38.0	6
28.2	47.26	36	82.1	9	59.44	9	51.5	2	37.53	29	98.1	10	58.42	20	37.0	10
July 8.1	46.93	33	80.7	14	59.36	8	51.1	4	37.26	27	96.7	14	58.24	18	35.6	14
		29		19		6		7		23		18		15		18
18.1	46.64		78.8		59.30		50.4		37.03		94.9		58.09		33.8	
28.1	46.39	25	76.6	22	59.27	3	49.5	9	36.83	20	92.7	22	57.96	13	31.7	21
Aug. 7.1	46.20	19	74.1	25	59.27	0	48.4	11	36.68	15	90.2	25	57.87	9	29.4	23
17.0	46.08	12	71.3	28	59.29	2	47.1	13	36.59	9	87.6	26	57.82	5	27.0	24
27.0	46.04	4	68.5	28	59.34	5	45.5	16	36.57	2	84.8	28	57.82	0	24.4	26
		4		29		9		17		4		28		5		25
Sept. 6.0	46.08		65.6		59.43		43.8		36.61		82.0		57.87		21.9	
16.0	46.20	12	62.8	28	59.55	12	41.9	19	36.72	11	79.3	27	57.98	11	19.5	24
25.9	46.41	21	60.2	26	59.71	16	39.8	21	36.91	19	76.9	24	58.14	16	17.4	21
Oct. 5.9	46.71	30	58.0	22	59.91	20	37.6	22	37.17	26	74.7	22	58.36	22	15.6	18
15.9	47.09	38	56.2	18	60.15	24	35.3	23	37.50	33	73.0	17	58.63	27	14.3	13
		45		14		27		24		40		12		33		9
25.8	47.54		54.8		60.42		32.9		37.90		71.8		58.96		13.4	
Nov. 4.8	48.05	51	54.0	8	60.73	31	30.6	23	38.35	45	71.1	7	59.33	37	13.0	4
14.8	48.61	56	53.8	2	61.07	34	28.3	23	38.85	50	71.0	1	59.74	41	13.3	3
24.8	49.20	59	54.3	5	61.43	36	26.1	22	39.37	52	71.6	6	60.17	43	14.2	9
Dec. 4.7	49.81	61	55.4	11	61.81	38	24.1	20	39.90	53	72.8	12	60.61	44	15.6	14
		59		18		39		18		53		18		44		19
14.7	50.40		57.2		62.20		22.3		40.43		74.6		61.05		17.5	
24.7	50.96	56	59.5	23	62.58	38	20.9	14	40.94	51	77.0	24	61.48	43	19.9	24
34.7	51.48	52	62.3	28	62.94	36	19.8	11	41.40	46	79.8	28	61.87	39	22.8	29
Sec δ, Tan δ	2.276		−2.044		1.168		+0.604		1.954		−1.679		1.523		−1.148	
Mean Place	$48^{s}.827$		$61''.40$		$58^{s}.500$		$45''.89$		$38^{s}.631$		$78''.09$		$58^{s}.891$		$18''.89$	
$D'_{\psi}\alpha$, $D_{\omega}\alpha$	−0.02		−0.13		+0.01		+0.04		−0.01		−0.11		−0.01		−0.07	
$D_{\psi}\delta$, $D_{\omega}\delta$	−0.4		+0.3		−0.4		+0.3		−0.4		+0.3		−0.4		+0.3	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	*l* Leonis. Mag. 5.3				δ² Chamæleon. Mag. 4.6				ν Hydræ. Mag. 3.3				46 Leonis Minoris. Mag. 3.9			
	Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination S.		Right Ascension.		Declination N.	
	h m 10 44		° ′ +11 0		h m 10 44		° ′ −80 4		h m 10 45		° ′ −15 43		h m 10 48		° ′ +34 40	
	s		″		s		″		s		″		s		″	
Jan. 0.7	38.28		40.1		58.86		10.9		16.99		49.0		24.24		76.1	
10.6	38.59	31	38.4	17	59.90	104	13.7	28	17.29	30	51.5	25	24.60	36	75.4	7
20.6	38.87	28	37.0	14	60.77	87	16.9	32	17.56	27	54.0	25	24.93	33	75.0	4
30.6	39.11	24	35.8	12	61.45	68	20.5	36	17.79	23	56.5	25	25.21	28	75.0	0
Feb. 9.6	39.30	19	34.9	9	61.92	47	24.3	38	17.97	18	58.8	23	25.44	23	75.5	5
19.5	39.44	14	34.3	6	62.18	26	28.2	39	18.10	13	61.0	22	25.61	17	76.3	8
29.5	39.54	10	34.0	3	62.23	5	32.2	40	18.19	9	62.9	19	25.73	12	77.4	11
Mar. 10.5	39.59	5	33.9	1	62.08	15	36.1	39	18.24	5	64.6	17	25.79	6	78.7	13
20.5	39.60	1	34.1	2	61.73	35	39.9	38	18.24	0	66.0	14	25.80	1	80.1	14
30.4	39.57	3	34.4	3	61.20	53	43.5	36	18.21	3	67.2	12	25.76	4	81.6	15
Apr. 9.4	39.52	5	34.9	5	60.51	69	46.8	33	18.15	6	68.1	9	25.69	7	83.1	15
19.4	39.44	8	35.4	5	59.68	83	49.7	29	18.06	9	68.7	6	25.59	10	84.6	15
29.3	39.34	10	36.0	6	58.73	95	52.2	25	17.96	10	69.1	4	25.47	12	85.9	13
May 9.3	39.24	10	36.7	7	57.69	104	54.3	21	17.85	11	69.2	1	25.33	14	87.0	11
19.3	39.14	10	37.3	6	56.58	111	55.9	16	17.74	11	69.1	1	25.18	15	87.9	9
29.3	39.03	11	37.9	6	55.43	115	56.9	10	17.63	11	68.8	3	25.04	14	88.5	6
June 8.2	38.93	10	38.4	5	54.26	117	57.4	5	17.52	11	68.3	5	24.90	14	88.9	4
18.2	38.84	9	38.9	5	53.10	116	57.3	1	17.42	10	67.5	8	24.78	12	89.0	1
28.2	38.76	8	39.3	4	51.98	112	56.7	6	17.33	9	66.6	9	24.67	11	88.7	3
July 8.2	38.70	6	39.6	3	50.94	104	55.5	12	17.25	8	65.6	10	24.58	9	88.2	5
18.1	38.66	4	39.8	2	50.00	94	53.9	16	17.19	6	64.5	11	24.51	7	87.4	8
28.1	38.63	3	39.9	1	49.18	82	51.8	21	17.15	4	63.3	12	24.47	4	86.4	10
Aug. 7.1	38.63	0	39.8	1	48.52	66	49.3	25	17.13	2	62.0	13	24.46	1	85.1	13
17.0	38.65	2	39.6	2	48.05	47	46.6	27	17.14	1	60.8	12	24.47	1	83.6	15
27.0	38.69	4	39.2	4	47.78	27	43.7	29	17.17	3	59.7	11	24.51	4	81.8	18
Sept. 6.0	38.76	7	38.7	5	47.72	6	40.6	31	17.24	7	58.7	10	24.59	8	79.9	19
16.0	38.87	11	37.9	8	47.89	17	37.6	30	17.34	10	57.9	8	24.71	12	77.8	21
25.9	39.01	14	36.9	10	48.30	41	34.7	29	17.47	13	57.3	6	24.86	15	75.5	23
Oct. 5.9	39.19	18	35.7	12	48.92	62	32.1	26	17.64	17	57.1	2	25.05	19	73.1	24
15.9	39.40	21	34.2	15	49.75	83	29.8	23	17.85	21	57.2	1	25.29	24	70.6	25
25.9	39.64	24	32.6	16	50.76	101	28.0	18	18.10	25	57.7	5	25.57	28	68.1	25
Nov. 4.8	39.92	28	30.8	18	51.92	116	26.8	12	18.38	28	58.6	9	25.88	31	65.6	25
14.8	40.22	30	28.8	20	53.19	127	26.2	6	18.69	31	59.8	12	26.22	34	63.2	24
24.8	40.55	33	26.7	21	54.53	134	26.2	0	19.02	33	61.4	16	26.59	37	60.9	23
Dec. 4.7	40.89	34	24.6	21	55.89	136	26.9	7	19.36	34	63.3	19	26.98	39	58.9	20
14.7	41.24	35	22.5	21	57.22	133	28.2	13	19.71	35	65.5	22	27.38	40	57.1	18
24.7	41.58	34	20.5	20	58.47	125	30.1	19	20.05	34	67.9	24	27.77	39	55.7	14
34.7	41.91	33	18.7	18	59.61	114	32.6	25	20.37	32	70.4	25	28.15	38	54.7	10
Sec δ, Tan δ	1.019		+0.195		5.803		−5.716		1.039		−0.282		1.216		+0.692	
Mean Place	38ˢ.004		39″.70		58ˢ.043		33″.71		16ˢ.900		57″.76		23ˢ.655		82″.51	
D′ψ α, Dω α	0.00		+0.01		−0.05		−0.36		0.00		−0.02		+0.01		+0.04	
Dψ δ, Dω δ	−0.4		+0.3		−0.4		+0.3		−0.4		+0.3		−0.4		+0.3	

Mean Solar Date.	**54 Leonis.** Mag. 4.5				**ι Antliæ.** Mag. 4.7				**Groombridge 1706.** Mag. 6.3				***α* Crateris.** Mag. 4.2			
	Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination S.	
	h m 10 50 s		° ′ +25 12 ″		h m 10 52 s		° ′ −36 39 ″		h m 10 52 s		° ′ +78 13 ″		h m 10 55 s		° ′ −17 49 ″	
Jan. 0.7	51.47		65.7		37.10		37.4		61.31		77.4		29.15		39.2	
10.6	51.81	34	64.6	11	37.43	33	40.2	28	62.46	115	78.2	8	29.46	31	41.8	26
20.6	52.11	30	63.8	8	37.73	30	43.3	31	63.49	103	79.6	14	29.74	28	44.4	26
30.6	52.37	26	63.3	5	37.98	25	46.5	32	64.38	89	81.5	19	29.97	23	46.9	25
Feb. 9.6	52.58	21	63.2	1	38.18	20	49.7	32	65.09	71	83.8	23	30.16	19	49.3	24
19.5	52.75	17	63.4	2	38.32	14	52.9	32	65.60	51	86.4	26	30.31	15	51.6	23
29.5	52.86	11	63.9	5	38.41	9	55.9	30	65.90	30	89.3	29	30.41	10	53.7	21
Mar. 10.5	52.92	6	64.7	8	38.45	4	58.7	28	65.98	8	92.3	30	30.46	5	55.5	18
20.5	52.93	1	65.7	10	38.45	0	61.2	25	65.86	12	95.3	30	30.47	1	57.1	16
30.4	52.90	3	66.8	11	38.40	5	63.5	23	65.55	31	98.1	28	30.44	3	58.4	13
Apr. 9.4	52.84	6	67.9	11	38.32	8	65.5	20	65.06	49	100.6	25	30.39	5	59.4	10
19.4	52.76	8	69.1	12	38.21	11	67.1	16	64.43	63	102.8	22	30.31	8	60.2	8
29.3	52.66	10	70.2	11	38.08	13	68.3	12	63.69	74	104.6	18	30.22	9	60.7	5
May 9.3	52.54	12	71.1	9	37.94	14	69.2	9	62.86	83	105.9	13	30.11	11	60.9	2
19.3	52.42	12	71.9	8	37.78	16	69.7	5	61.99	87	106.6	7	30.00	11	60.9	0
29.3	52.30	12	72.6	7	37.62	16	69.8	1	61.10	89	106.8	2	29.88	12	60.7	2
June 8.2	52.18	12	73.1	5	37.47	15	69.6	2	60.23	87	106.4	4	29.77	11	60.2	5
18.2	52.07	11	73.4	3	37.32	15	69.0	6	59.40	83	105.5	9	29.67	10	59.5	7
28.2	51.98	9	73.5	1	37.18	14	68.0	10	58.64	76	104.1	14	29.57	10	58.6	9
July 8.2	51.91	7	73.3	2	37.05	13	66.7	13	57.96	68	102.2	19	29.49	8	57.6	10
18.1	51.85	6	72.9	4	36.94	11	65.2	15	57.39	57	99.8	24	29.42	7	56.5	11
28.1	51.81	4	72.3	6	36.86	8	63.4	18	56.93	46	97.1	27	29.37	5	55.3	12
Aug. 7.1	51.80	1	71.5	8	36.80	6	61.4	20	56.60	33	94.0	31	29.34	3	54.0	13
17.0	51.82	2	70.5	10	36.77	3	59.4	20	56.41	19	90.7	33	29.33	1	52.7	13
27.0	51.86	4	69.3	12	36.78	1	57.3	21	56.37	4	87.2	35	29.35	2	51.4	13
Sept. 6.0	51.93	7	67.9	14	36.83	5	55.3	20	56.48	11	83.5	37	29.40	5	50.3	11
16.0	52.03	10	66.3	16	36.92	9	53.4	19	56.74	26	79.8	37	29.49	9	49.4	9
25.9	52.17	14	64.5	18	37.05	13	51.8	16	57.15	41	76.1	37	29.62	13	48.8	6
Oct. 5.9	52.35	18	62.5	20	37.23	18	50.5	13	57.71	56	72.5	36	29.78	16	48.5	3
15.9	52.57	22	60.4	21	37.46	23	49.6	9	58.42	71	69.1	34	29.98	20	48.5	0
25.9	52.82	25	58.2	22	37.74	28	49.1	5	59.27	85	65.9	32	30.22	24	48.8	3
Nov. 4.8	53.11	29	55.9	23	38.05	31	49.1	0	60.25	98	63.0	29	30.50	28	49.5	7
14.8	53.43	32	53.6	23	38.40	35	49.6	5	61.34	109	60.6	24	30.80	30	50.6	11
24.8	53.78	35	51.4	22	38.77	37	50.7	11	62.52	118	58.7	19	31.13	33	52.2	16
Dec. 4.7	54.14	36	49.3	21	39.16	39	52.3	16	63.75	123	57.3	14	31.47	34	54.1	19
14.7	54.51	37	47.4	19	39.55	39	54.4	21	65.00	125	56.4	9	31.82	35	56.2	21
24.7	54.88	37	45.7	17	39.93	38	56.8	24	66.25	125	56.2	2	32.16	34	58.6	24
34.7	55.23	35	44.3	14	40.28	35	59.6	28	67.44	119	56.6	4	32.49	33	61.2	26
Sec *δ*, Tan *δ*	1.105		+0.471		1.247		−0.744		4.906		+4.804		1.050		−0.322	
Mean Place	51ˢ.053		69″.73		37ˢ.128		52″.25		56ˢ.797		90″.71		29ˢ.134		48″.50	
D′ψ *α*, Dω *α*	0.00		+0.03		−0.01		−0.05		+0.04		+0.31		0.00		−0.02	
Dψ *δ*, Dω *δ*	−0.4		+0.3		−0.4		+0.3		−0.4		+0.3		−0.4		+0.3	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	*d* Leonis. Mag. 5.0				*β* Ursæ Majoris. Mag. 2.4				*α* Ursæ Majoris. Mag. 2.0				*χ* Leonis. Mag. 4.7			
	Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination N.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	10 56		+ 4 5		10 56		+56 50		10 58		+62 13		11 0		+ 7 48	
	s		″		s		″		s		″		s		″	
Jan. 0.7	1.14	31	26.8	20	33.65	50	64.2	0	20.07	57	22.4	2	28.89	31	44.4	19
10.7	1.45	28	24.8	18	34.15	45	64.2	6	20.64	52	22.6	8	29.20	29	42.5	16
20.6	1.73	24	23.0	16	34.60	39	64.8	11	21.16	45	23.4	12	29.49	25	40.9	14
30.6	1.97	20	21.4	13	34.99	32	65.9	15	21.61	36	24.6	17	29.74	20	39.5	11
Feb. 9.6	2.17	15	20.1	10	35.31	25	67.4	19	21.97	28	26.3	21	29.94	16	38.4	8
19.5	2.32	11	19.1	8	35.56	16	69.3	21	22.25	18	28.4	24	30.10	11	37.6	6
29.5	2.43	6	18.3	5	35.72	8	71.4	24	22.43	8	30.8	26	30.21	6	37.0	3
Mar. 10.5	2.49	2	17.8	2	35.80	0	73.8	25	22.51	1	33.4	26	30.27	3	36.7	1
20.5	2.51	2	17.6	1	35.80	7	76.3	24	22.50	9	36.0	26	30.30	1	36.6	2
30.4	2.49	5	17.5	1	35.73	14	78.7	23	22.41	17	38.6	24	30.29	4	36.8	3
Apr. 9.4	2.44	7	17.6	3	35.59	18	81.0	20	22.24	22	41.0	21	30.25	7	37.1	4
19.4	2.37	8	17.9	4	35.41	22	83.0	18	22.02	27	43.1	18	30.18	9	37.5	5
29.4	2.29	9	18.3	4	35.19	25	84.8	14	21.75	31	44.9	14	30.09	9	38.0	6
May 9.3	2.20	10	18.7	5	34.94	26	86.2	10	21.44	33	46.3	10	30.00	10	38.6	6
19.3	2.10	10	19.2	6	34.68	26	87.2	5	21.11	33	47.3	5	29.90	10	39.2	6
29.3	2.00	10	19.8	6	34.42	26	87.7	1	20.78	32	47.8	0	29.80	10	39.8	6
June 8.2	1.90	9	20.4	5	34.16	24	87.8	3	20.46	30	47.8	5	29.70	10	40.4	5
18.2	1.81	8	20.9	6	33.92	22	87.5	8	20.16	28	47.3	9	29.60	8	40.9	5
28.2	1.73	7	21.5	5	33.70	19	86.7	13	19.88	24	46.4	14	29.52	7	41.4	4
July 8.2	1.66	5	22.0	5	33.51	15	85.4	16	19.64	20	45.0	18	29.45	5	41.8	4
18.1	1.61	4	22.5	4	33.36	12	83.8	19	19.44	16	43.2	21	29.40	4	42.2	2
28.1	1.57	2	22.9	3	33.24	8	81.9	23	19.28	10	41.1	25	29.36	2	42.4	1
Aug. 7.1	1.55	1	23.2	1	33.16	3	79.6	26	19.18	5	38.6	28	29.34	0	42.5	1
17.1	1.56	4	23.3	0	33.13	2	77.0	28	19.13	1	35.8	30	29.34	3	42.4	2
27.0	1.60	6	23.3	1	33.15	8	74.2	30	19.14	7	32.8	32	29.37	6	42.2	4
Sept. 6.0	1.66	9	23.2	4	33.23	13	71.2	32	19.21	14	29.6	33	29.43	9	41.8	6
16.0	1.75	13	22.8	6	33.36	19	68.0	32	19.35	20	26.3	34	29.52	12	41.2	8
25.9	1.88	16	22.2	9	33.55	25	64.8	32	19.55	27	22.9	34	29.64	16	40.4	11
Oct. 5.9	2.04	20	21.3	11	33.80	30	61.6	32	19.82	34	19.5	33	29.80	19	39.3	13
15.9	2.24	23	20.2	14	34.10	36	58.4	30	20.16	41	16.2	32	29.99	23	38.0	15
25.9	2.47	26	18.8	16	34.46	41	55.4	29	20.57	47	13.0	29	30.22	26	36.5	18
Nov. 4.8	2.73	30	17.2	18	34.87	46	52.5	26	21.04	52	10.1	26	30.48	30	34.7	19
14.8	3.03	32	15.4	20	35.33	50	49.9	23	21.56	56	7.5	23	30.78	32	32.8	21
24.8	3.35	34	13.4	21	35.83	53	47.6	19	22.12	59	5.2	18	31.10	34	30.7	21
Dec. 4.8	3.69	34	11.3	22	36.36	55	45.7	14	22.71	61	3.4	13	31.44	34	28.6	22
14.7	4.03	34	9.1	21	36.91	53	44.3	9	23.32	61	2.1	7	31.78	34	26.4	21
24.7	4.37	33	7.0	21	37.44	52	43.4	3	23.93	60	1.4	2	32.12	33	24.3	20
34.7	4.70		4.9		37.96		43.1		24.53		1.2		32.45		22.3	
Sec δ, Tan δ	1.003		+0.072		1.829		+1.531		2.146		+1.899		1.009		+0.137	
Mean Place	0ˢ.984		24″.56		32ˢ.390		75″.65		18ˢ.487		34″.69		28ˢ.724		43″.47	
D′ψ α, Dω α	0.00		0.00		+0.01		+0.10		+0.01		+0.12		0.00		+0.01	
Dψ δ, Dω δ	−0.4		+0.3		−0.4		+0.3		−0.4		+0.3		−0.4		+0.3	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	p^4 Leonis. Mag. 5.7				ψ Ursæ Majoris. Mag. 3.2				β Crateris. Mag. 4.5				δ Leonis. Mag. 2.6			
	Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination N.	
	h m 11 2 s		° ′ + 2 25 ″		h m 11 4 s		° ′ +44 58 ″		h m 11 7 s		° ′ −22 20 ″		h m 11 9 s		° ′ +20 59 ″	
Jan. 0.7	25.05		63.3		44.05		24.7		19.61		32.8		26.11		78.0	
10.7	25.36	31	61.3	20	44.46	41	24.2	5	19.93	32	35.4	26	26.44	33	76.5	15
20.6	25.64	28	59.4	19	44.84	38	24.1	1	20.22	29	38.1	27	26.75	31	75.4	11
30.6	25.89	25	57.8	16	45.17	33	24.6	5	20.47	25	40.8	27	27.02	27	74.6	8
Feb. 9.6	26.09	20	56.4	14	45.45	28	25.5	9	20.67	20	43.4	26	27.24	22	74.2	4
19.5	26.25	16	55.2	12	45.66	21	26.8	13	20.83	16	45.9	25	27.42	18	74.1	1
29.5	26.36	11	54.3	9	45.81	15	28.4	16	20.94	11	48.2	23	27.55	13	74.4	3
Mar. 10.5	26.42	6	53.7	6	45.89	8	30.2	18	21.00	6	50.3	21	27.63	8	74.9	5
20.5	26.45	3	53.3	4	45.91	2	32.2	20	21.03	3	52.2	19	27.66	3	75.6	7
30.4	26.44	1	53.2	1	45.88	3	34.2	20	21.02	1	53.8	16	27.66	0	76.5	9
Apr. 9.4	26.40	4	53.2	0	45.80	8	36.2	20	20.97	5	55.1	13	27.62	4	77.5	10
19.4	26.33	7	53.4	2	45.68	12	38.0	18	20.90	7	56.1	10	27.55	7	78.5	10
29.4	26.25	8	53.7	3	45.54	14	39.6	16	20.81	9	56.8	7	27.47	8	79.5	10
May 9.3	26.16	9	54.1	4	45.37	17	41.0	14	20.71	10	57.3	5	27.37	10	80.5	10
19.3	26.06	10	54.6	5	45.19	18	42.1	11	20.60	11	57.5	2	27.26	11	81.4	9
29.3	25.96	10	55.1	5	45.01	18	42.8	7	20.48	12	57.4	1	27.15	11	82.1	7
June 8.2	25.86	10	55.7	6	44.83	18	43.2	4	20.36	12	57.0	4	27.04	11	82.7	6
18.2	25.77	9	56.3	6	44.67	16	43.2	0	20.25	11	56.4	6	26.94	10	83.1	4
28.2	25.69	8	56.9	6	44.52	15	42.8	4	20.14	11	55.6	8	26.85	9	83.3	2
July 8.2	25.62	7	57.4	5	44.39	13	42.0	8	20.05	9	54.6	10	26.77	8	83.3	0
18.1	25.56	6	57.9	5	44.28	11	40.9	11	19.97	8	53.4	12	26.70	7	83.2	1
28.1	25.52	4	58.3	4	44.20	8	39.5	14	19.90	7	52.1	13	26.65	5	82.9	3
Aug. 7.1	25.50	2	58.7	4	44.15	5	37.8	17	19.86	4	50.7	14	26.62	3	82.3	6
17.1	25.50	0	59.0	3	44.13	2	35.8	20	19.84	2	49.2	15	26.62	0	81.5	8
27.0	25.53	3	59.1	1	44.15	2	33.5	23	19.84	0	47.8	14	26.64	2	80.6	9
Sept. 6.0	25.58	5	59.0	1	44.21	6	31.0	25	19.88	4	46.5	13	26.69	5	79.4	12
16.0	25.66	8	58.7	3	44.31	10	28.4	26	19.96	8	45.4	11	26.77	8	78.0	14
25.9	25.78	12	58.2	5	44.46	15	25.6	28	20.08	12	44.5	9	26.89	12	76.4	16
Oct. 5.9	25.93	15	57.4	8	44.65	19	22.7	29	20.23	15	43.9	6	27.05	16	74.6	18
15.9	26.12	19	56.4	10	44.89	24	19.8	29	20.42	19	43.6	3	27.24	19	72.6	20
25.9	26.35	23	55.1	13	45.18	29	16.9	29	20.66	24	43.7	1	27.47	23	70.5	21
Nov. 4.8	26.62	27	53.5	16	45.51	33	14.1	28	20.93	27	44.2	5	27.74	27	68.2	23
14.8	26.91	29	51.7	18	45.88	37	11.4	27	21.24	31	45.1	9	28.05	31	65.9	23
24.8	27.23	32	49.8	19	46.28	40	9.0	24	21.58	34	46.5	14	28.38	33	63.6	23
Dec. 4.8	27.56	33	47.7	21	46.71	43	6.9	21	21.93	35	48.3	18	28.73	35	61.4	22
14.7	27.90	34	45.5	22	47.15	44	5.2	17	22.29	36	50.4	21	29.09	36	59.3	21
24.7	28.24	34	43.3	22	47.59	44	3.9	13	22.64	35	52.7	23	29.45	36	57.4	19
34.7	28.56	32	41.2	21	48.02	43	3.1	8	22.97	33	55.3	26	29.80	35	55.8	16
Sec δ, Tan δ	1.001		+0.041		1.414		+0.999		1.081		−0.411		1.071		+0.384	
Mean Place	$24^{s}.939$		60″.76		$43^{s}.311$		34″.31		$19^{s}.687$		43″.27		$25^{s}.847$		81″.52	
$D'_{\psi}\,\alpha$, $D_{\omega}\,\alpha$	0.00		0.00		+0.01		+0.06		0.00		−0.03		0.00		+0.02	
$D_{\psi}\,\delta$, $D_{\omega}\,\delta$	−0.4		+0.2		−0.4		+0.2		−0.4		+0.2		−0.4		+0.2	

Mean Solar Date.	**θ Leonis.** Mag. 3.4				**ν Ursæ Majoris.** Mag. 3.7				**δ Crateris.** Mag. 3.8				**σ Leonis.** Mag. 4.1			
	Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination N.	
	h m 11 9		° ′ +15 54		h m 11 13		° ′ +33 33		h m 11 14		° ′ −14 18		h m 11 16		° ′ + 6 30	
	s		″		s		″		s		″		s		″	
Jan. 0.7	37.61		36.6		44.18		81.5		56.31		0.1		36.05		43.4	
10.7	37.94	33	34.9	17	44.55	37	80.5	10	56.62	31	2.5	24	36.37	32	41.4	20
20.6	38.24	30	33.6	13	44.89	34	79.9	6	56.91	29	5.0	25	36.66	29	39.7	17
30.6	38.50	26	32.6	10	45.19	30	79.7	2	57.16	25	7.4	24	36.92	26	38.2	15
Feb. 9.6	38.72	22	31.9	7	45.44	25	79.9	2	57.37	21	9.6	22	37.14	22	37.0	12
19.6	38.89	17	31.5	4	45.64	20	80.6	7	57.54	17	11.7	21	37.31	17	36.0	10
29.5	39.01	12	31.4	1	45.78	14	81.6	10	57.66	12	13.6	19	37.44	13	35.3	7
Mar. 10.5	39.09	8	31.6	2	45.87	9	82.8	12	57.73	7	15.3	17	37.52	8	34.9	4
20.5	39.12	3	32.1	5	45.91	4	84.2	14	57.77	4	16.7	14	37.56	4	34.8	1
30.4	39.12	0	32.7	6	45.90	1	85.7	15	57.77	0	17.8	11	37.57	1	34.9	1
Apr. 9.4	39.08	4	33.4	7	45.85	5	87.3	16	57.74	3	18.7	9	37.54	3	35.2	3
19.4	39.02	6	34.2	8	45.77	8	88.8	15	57.68	6	19.3	6	37.49	5	35.6	4
29.4	38.94	8	35.1	9	45.67	10	90.3	15	57.60	8	19.7	4	37.42	7	36.1	5
May 9.3	38.84	10	35.9	8	45.55	12	91.6	13	57.51	9	19.9	2	37.33	9	36.6	5
19.3	38.74	10	36.7	8	45.41	14	92.7	11	57.41	10	19.8	1	37.24	9	37.2	6
29.3	38.64	10	37.4	7	45.27	14	93.5	8	57.31	10	19.6	2	37.14	10	37.8	6
June 8.3	38.53	11	38.0	6	45.14	13	94.0	5	57.21	10	19.2	4	37.04	10	38.4	6
18.2	38.44	9	38.5	5	45.02	12	94.2	2	57.11	10	18.6	6	36.95	9	39.0	6
28.2	38.35	9	38.8	3	44.90	12	94.2	0	57.02	9	17.8	8	36.87	8	39.5	5
July 8.2	38.27	8	39.0	2	44.80	10	93.9	3	56.93	9	16.9	9	36.79	8	39.9	4
18.1	38.21	6	39.0	0	44.71	9	93.3	6	56.85	8	15.9	10	36.73	6	40.3	4
28.1	38.17	4	38.9	1	44.64	7	92.4	9	56.79	6	14.9	10	36.68	5	40.6	3
Aug. 7.1	38.14	3	38.6	3	44.60	4	91.3	11	56.75	4	13.8	11	36.65	3	40.8	2
17.1	38.13	1	38.1	5	44.59	1	89.9	14	56.73	2	12.8	10	36.64	1	40.8	0
27.0	38.15	2	37.4	7	44.60	1	88.2	17	56.74	1	11.8	10	36.65	1	40.6	2
Sept. 6.0	38.20	5	36.5	9	44.65	5	86.3	19	56.77	3	10.9	9	36.69	4	40.3	3
16.0	38.28	8	35.4	11	44.73	8	84.2	21	56.84	7	10.2	7	36.76	7	39.8	5
26.0	38.40	12	34.1	13	44.85	12	81.9	23	56.95	11	9.7	5	36.87	11	39.0	8
Oct. 5.9	38.55	15	32.6	15	45.01	16	79.5	24	57.09	14	9.5	2	37.01	14	38.0	10
15.9	38.74	19	30.9	17	45.21	20	76.9	26	57.27	18	9.7	2	37.19	18	36.7	13
25.9	38.97	23	29.0	19	45.46	25	74.3	26	57.50	23	10.2	5	37.40	21	35.2	15
Nov. 4.8	39.23	26	26.9	21	45.75	29	71.7	26	57.76	26	11.0	8	37.66	26	33.5	17
14.8	39.52	29	24.7	22	46.07	32	69.2	25	58.05	29	12.2	12	37.95	29	31.6	19
24.8	39.85	33	22.5	22	46.42	35	66.7	25	58.37	32	13.7	15	38.26	31	29.5	21
Dec. 4.8	40.20	35	20.3	22	46.80	38	64.5	22	58.71	34	15.6	19	38.59	33	27.3	22
14.7	40.55	35	18.1	22	47.19	39	62.5	20	59.06	35	17.7	21	38.94	35	25.1	22
24.7	40.90	35	16.1	20	47.58	39	60.8	17	59.41	35	20.0	23	39.28	34	23.0	21
34.7	41.24	34	14.3	18	47.96	38	59.5	13	59.74	33	22.4	24	39.61	33	21.0	20
Sec δ, Tan δ	1.039		+0.286		1.200		+0.664		1.032		−0.255		1.007		+0.114	
Mean Place	37ˢ.407		38″.57		43ˢ.757		88″.81		56ˢ.389		7″.86		35ˢ.985		42″.60	
D′ψ α, Dω α	0.00		+0.02		0.00		+0.04		0.00		−0.02		0.00		+0.01	
Dψ δ, Dω δ	−0.4		+0.2		−0.4		+0.2		−0.4		+0.2		−0.4		+0.2	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	π Centauri. Mag. 4.3				ι Leonis. Mag. 4.0				τ Leonis. Mag. 5.2				λ Draconis. Mag. 4.1			
	Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination N.	
	h m 11 16		° ′ −54 0		h m 11 19		° ′ +11 0		h m 11 23		° ′ + 3 20		h m 11 26		° ′ +69 48	
	s		″		s		″		s		″		s		″	
Jan. 0.7	59.06		12.1		20.34		49.9		24.73		29.3		13.66		46.0	
10.7	59.50	44	14.8	27	20.67	33	48.1	18	25.05	32	27.3	20	14.41	75	46.1	1
20.6	59.88	38	17.9	31	20.97	30	46.5	16	25.34	29	25.4	19	15.11	70	46.8	7
30.6	60.21	33	21.3	34	21.24	27	45.2	13	25.60	26	23.7	17	15.73	62	48.1	13
Feb. 9.6	60.48	27	24.9	36	21.46	22	44.2	10	25.82	22	22.3	14	16.26	53	49.8	17
19.6	60.68	20	28.5	36	21.64	18	43.5	7	26.00	18	21.2	11	16.67	41	52.0	22
29.5	60.82	14	32.1	36	21.77	13	43.2	3	26.13	13	20.3	9	16.96	29	54.6	26
Mar. 10.5	60.89	7	35.6	35	21.86	9	43.1	1	26.22	9	19.7	6	17.12	16	57.4	28
20.5	60.90	1	38.9	33	21.90	4	43.2	1	26.27	5	19.4	3	17.16	4	60.3	29
30.4	60.85	5	42.0	31	21.91	1	43.5	3	26.28	1	19.3	1	17.08	8	63.1	28
Apr. 9.4	60.75	10	44.8	28	21.88	3	44.0	5	26.26	2	19.4	1	16.90	18	65.7	26
19.4	60.61	14	47.3	25	21.83	5	44.6	6	26.22	4	19.6	2	16.62	28	68.1	24
29.4	60.44	17	49.4	21	21.76	7	45.3	7	26.15	7	20.0	4	16.27	35	70.2	21
May 9.3	60.24	20	51.1	17	21.67	9	46.0	7	26.07	8	20.5	5	15.86	41	71.9	17
19.3	60.01	23	52.3	12	21.58	9	46.8	8	25.98	9	21.0	5	15.41	45	73.2	13
29.3	59.77	24	53.1	8	21.48	10	47.5	7	25.89	9	21.6	6	14.93	48	73.9	7
June 8.3	59.52	25	53.4	3	21.38	10	48.1	6	25.79	10	22.2	6	14.45	48	74.1	2
18.2	59.27	25	53.3	1	21.29	9	48.6	5	25.70	9	22.8	6	13.98	47	73.8	3
28.2	59.03	24	52.7	6	21.20	9	49.0	4	25.62	8	23.3	5	13.54	44	73.0	8
July 8.2	58.80	23	51.6	11	21.12	8	49.4	4	25.54	8	23.8	5	13.13	41	71.7	13
18.1	58.59	21	50.1	15	21.05	7	49.6	2	25.47	7	24.3	5	12.76	37	69.9	18
28.1	58.40	19	48.3	18	21.00	5	49.7	1	25.42	5	24.7	4	12.45	31	67.7	22
Aug. 7.1	58.25	15	46.1	22	20.97	3	49.6	1	25.38	4	25.0	3	12.21	24	65.1	26
17.1	58.14	11	43.7	24	20.96	1	49.4	2	25.36	2	25.2	2	12.03	18	62.2	29
27.0	58.08	6	41.2	25	20.97	1	49.0	4	25.37	1	25.2	0	11.93	10	59.0	32
Sept. 6.0	58.07	1	38.7	25	21.01	4	48.4	6	25.40	3	25.0	2	11.92	1	55.6	34
16.0	58.12	5	36.2	25	21.08	7	47.6	8	25.46	6	24.7	3	11.99	7	52.0	36
26.0	58.24	12	33.8	24	21.18	10	46.6	10	25.56	10	24.1	6	12.15	16	48.3	37
Oct. 5.9	58.43	19	31.6	22	21.32	14	45.3	13	25.70	14	23.3	8	12.41	26	44.7	36
15.9	58.68	25	29.8	18	21.50	18	43.8	15	25.87	17	22.2	11	12.76	35	41.1	36
25.9	59.00	32	28.5	13	21.72	22	42.1	17	26.08	21	20.8	14	13.20	44	37.6	35
Nov. 4.8	59.37	37	27.7	8	21.97	25	40.2	19	26.33	25	19.2	16	13.74	54	34.4	32
14.8	59.80	43	27.4	3	22.26	29	38.1	21	26.61	28	17.4	18	14.36	62	31.5	29
24.8	60.26	46	27.7	3	22.58	32	35.9	22	26.92	31	15.4	20	15.04	68	29.0	25
Dec. 4.8	60.74	48	28.7	10	22.91	33	33.7	22	27.26	34	13.2	22	15.78	74	26.9	21
14.7	61.23	49	30.2	15	23.26	35	31.5	22	27.60	34	11.0	22	16.55	77	25.4	15
24.7	61.71	48	32.2	20	23.61	35	29.4	21	27.94	34	8.8	22	17.33	78	24.5	9
34.7	62.17	46	34.7	25	23.95	34	27.4	20	28.27	33	6.7	21	18.10	77	24.2	3
Sec δ, Tan δ	1.701		−1.377		1.019		+0.194		1.002		+0.058		2.898		+2.720	
Mean Place	59ˢ.370		31″.11		20ˢ.248		50″.75		24ˢ.727		27″.72		11ˢ.645		60″.80	
D′ψ α, Dω α	−0.01		−0.09		0.00		+0.01		0.00		0.00		+0.01		+0.18	
Dψ δ, Dω δ	−0.4		+0.2		−0.4		+0.2		−0.4		+0.2		−0.4		+0.1	

Mean Solar Date.	ξ Hydræ. Mag. 3.7				λ Centauri. Mag. 3.3				υ Leonis. Mag. 4.5				π Chamæleontis. Mag. 5.7			
	Right Ascension.		Declination S.		Right Ascension.		Declination S.		Right Ascension.		Declination S.		Right Ascension.		Declination S.	
	h m 11 28 s		° ′ −31 22 ″		h m 11 31 s		° ′ −62 31 ″		h m 11 32 s		° ′ − 0 20 ″		h m 11 33 s		° ′ −75 24 ″	
Jan. 0.7	39.99		1.5		42.33		37.6		26.50		13.5		36.61		11.3	
10.7	40.34	35	4.2	27	42.87	54	40.2	26	26.82	32	15.6	21	37.49	88	13.6	23
20.6	40.66	32	7.0	28	43.35	48	43.2	30	27.12	30	17.6	20	38.28	79	16.4	28
30.6	40.94	28	9.9	29	43.76	41	46.5	33	27.39	27	19.5	19	38.96	68	19.7	33
Feb. 9.6	41.17	23	12.8	29	44.11	35	50.0	35	27.62	23	21.1	16	39.51	55	23.3	36
19.6	41.35	18	15.7	29	44.38	27	53.7	37	27.80	18	22.4	13	39.92	41	27.1	38
29.5	41.49	14	18.4	27	44.56	18	57.5	38	27.94	14	23.5	11	40.20	28	31.0	39
Mar. 10.5	41.58	9	21.0	26	44.66	10	61.2	37	28.04	10	24.3	8	40.34	14	34.9	39
20.5	41.62	4	23.3	23	44.69	3	64.8	36	28.10	6	24.9	6	40.34	0	38.8	39
30.5	41.63	1	25.4	21	44.65	4	68.3	35	28.12	2	25.2	3	40.21	13	42.5	37
Apr. 9.4	41.60	3	27.3	19	44.54	11	71.5	32	28.10	2	25.3	1	39.96	25	46.0	35
19.4	41.54	6	28.9	16	44.37	17	74.3	28	28.06	4	25.2	1	39.60	36	49.3	33
29.4	41.46	8	30.1	12	44.15	22	76.8	25	28.00	6	25.0	2	39.14	46	52.2	29
May 9.3	41.36	10	31.0	9	43.89	26	78.9	21	27.93	7	24.7	3	38.60	54	54.7	25
19.3	41.24	12	31.6	6	43.60	29	80.6	17	27.85	8	24.3	4	37.99	61	56.7	20
29.3	41.11	13	31.9	3	43.29	31	81.8	12	27.76	9	23.8	5	37.32	67	58.3	16
June 8.3	40.98	13	31.8	1	42.95	34	82.5	7	27.66	10	23.2	6	36.61	71	59.3	10
18.2	40.85	13	31.4	4	42.60	35	82.7	2	27.57	9	22.6	6	35.88	73	59.8	5
28.2	40.72	13	30.7	7	42.26	34	82.4	3	27.48	9	22.0	6	35.15	73	59.8	0
July 8.2	40.60	12	29.7	10	41.93	33	81.6	8	27.40	8	21.4	6	34.44	71	59.2	6
18.2	40.49	11	28.5	12	41.61	32	80.3	13	27.33	7	20.9	5	33.76	68	58.1	11
28.1	40.39	10	27.1	14	41.32	29	78.6	17	27.27	6	20.4	5	33.14	62	56.5	16
Aug. 7.1	40.31	8	25.5	16	41.08	24	76.5	21	27.23	4	19.9	5	32.61	53	54.4	21
17.1	40.26	5	23.8	17	40.89	19	74.1	24	27.20	3	19.5	4	32.18	43	52.0	24
27.0	40.24	2	22.1	17	40.76	13	71.5	26	27.20	0	19.3	2	31.86	32	49.4	26
Sept. 6.0	40.25	1	20.4	17	40.70	6	68.8	27	27.22	2	19.3	0	31.68	18	46.6	28
16.0	40.30	5	18.8	16	40.72	2	66.1	27	27.28	6	19.4	1	31.65	3	43.6	30
26.0	40.39	9	17.4	14	40.83	11	63.5	26	27.37	9	19.8	4	31.78	13	40.6	30
Oct. 5.9	40.53	14	16.2	12	41.02	19	61.0	25	27.49	12	20.4	6	32.07	29	37.8	28
15.9	40.72	19	15.4	8	41.30	28	58.8	22	27.66	17	21.3	9	32.51	44	35.2	26
25.9	40.95	23	15.0	4	41.66	36	57.0	18	27.86	20	22.5	12	33.10	59	33.1	21
Nov. 4.9	41.22	27	15.0	0	42.10	44	55.7	13	28.10	24	23.9	14	33.82	72	31.4	17
14.8	41.53	31	15.5	5	42.60	50	55.0	7	28.38	28	25.6	17	34.66	84	30.3	11
24.8	41.87	34	16.5	10	43.15	55	54.9	1	28.68	30	27.5	19	35.58	92	29.8	5
Dec. 4.8	42.24	37	17.9	14	43.73	58	55.4	5	29.00	32	29.6	21	36.55	97	29.9	1
14.7	42.62	38	19.7	18	44.32	59	56.5	11	29.34	34	31.8	22	37.54	99	30.7	8
24.7	42.99	37	21.9	22	44.91	59	58.2	17	29.69	35	34.0	22	38.51	97	32.1	14
34.7	43.35	36	24.4	25	45.47	56	60.5	23	30.03	34	36.2	22	39.44	93	34.1	20
Sec δ, Tan δ	1.171		−0.610		2.168		−1.924		1.000		−0.006		3.970		−3.842	
Mean Place	$40^{s}.274$		$14''.45$		$42^{s}.893$		$58''.27$		$26^{s}.583$		$16''.02$		$37^{s}.470$		$33''.78$	
$D'_{\psi}\alpha$, $D_{\omega}\alpha$	0.00		−0.04		−0.01		−0.13		0.00		0.00		−0.01		−0.25	
$D_{\psi}\delta$, $D_{\omega}\delta$	−0.4		+0.1		−0.4		+0.1		−0.4		+0.1		−0.4		+0.1	

Mean Solar Date.	**3 Draconis.** Mag. 5.5				**ζ Crateris.** Mag. 4.9				**χ Ursæ Majoris.** Mag. 3.8				**β Leonis.** Mag. 2.2			
	Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination N.	
	h m 11 37 s		° ′ +67 13 ″		h m 11 40 s		° ′ −17 51 ″		h m 11 41 s		° ′ +48 15 ″		h m 11 44 s		° ′ +15 3 ″	
Jan. 0.7	36.12		40.0		17.78		32.9		25.13		50.3		34.34		47.4	
10.7	36.80	68	39.9	1	18.11	33	35.3	24	25.58	45	49.6	7	34.68	34	45.6	18
20.7	37.45	65	40.4	5	18.42	31	37.8	25	25.99	41	49.3	3	34.99	31	44.1	15
30.6	38.03	58	41.4	10	18.69	27	40.3	25	26.37	38	49.6	3	35.27	28	42.9	12
Feb. 9.6	38.52	49	43.0	16	18.93	24	42.7	24	26.70	33	50.4	8	35.52	25	42.0	9
19.6	38.92	40	45.0	20	19.12	19	45.0	23	26.96	26	51.6	12	35.73	21	41.5	5
29.5	39.21	29	47.4	24	19.27	15	47.0	20	27.16	20	53.2	16	35.88	15	41.3	2
Mar. 10.5	39.39	18	50.1	27	19.37	10	48.9	19	27.30	14	55.1	19	35.99	11	41.4	1
20.5	39.46	7	52.9	28	19.43	6	50.5	16	27.37	7	57.2	21	36.06	7	41.8	4
30.5	39.43	3	55.7	28	19.46	3	51.9	14	27.38	1	59.4	22	36.09	3	42.4	6
Apr. 9.4	39.30	13	58.4	27	19.45	1	53.0	11	27.34	4	61.7	23	36.09	0	43.1	7
19.4	39.08	22	60.9	25	19.41	4	53.9	9	27.25	9	63.9	22	36.05	4	44.0	9
29.4	38.79	29	63.1	22	19.35	6	54.6	7	27.12	13	65.9	20	35.99	6	44.9	9
May 9.4	38.45	34	64.9	18	19.28	7	55.0	4	26.97	15	67.6	17	35.92	7	45.8	9
19.3	38.07	38	66.3	14	19.19	9	55.2	2	26.79	18	69.0	14	35.84	8	46.7	9
29.3	37.66	41	67.2	9	19.10	9	55.1	1	26.60	19	70.1	11	35.74	10	47.5	8
June 8.3	37.24	42	67.6	4	19.00	10	54.8	3	26.41	19	70.8	7	35.64	10	48.2	7
18.2	36.83	41	67.6	0	18.89	11	54.3	5	26.22	19	71.1	3	35.54	10	48.8	6
28.2	36.43	40	67.0	6	18.79	10	53.7	6	26.03	19	71.0	1	35.45	9	49.3	5
July 8.2	36.06	37	65.8	12	18.69	10	52.9	8	25.86	17	70.4	6	35.36	9	49.6	3
18.2	35.72	34	64.2	16	18.60	9	51.9	10	25.70	16	69.4	10	35.28	8	49.7	1
28.1	35.43	29	62.2	20	18.52	8	50.9	10	25.57	13	68.1	13	35.21	7	49.6	1
Aug. 7.1	35.20	23	59.8	24	18.46	6	49.8	11	25.46	11	66.4	17	35.15	6	49.4	2
17.1	35.03	17	57.0	28	18.42	4	48.6	12	25.39	7	64.4	20	35.11	4	49.0	4
27.1	34.92	11	53.9	31	18.40	2	47.5	11	25.35	4	62.0	24	35.10	1	48.4	6
Sept. 6.0	34.88	4	50.5	34	18.41	1	46.5	10	25.35	0	59.4	26	35.11	1	47.6	8
16.0	34.92	4	47.0	35	18.45	4	45.6	9	25.39	4	56.6	28	35.15	4	46.5	11
26.0	35.04	12	43.4	36	18.53	8	45.0	6	25.48	9	53.6	30	35.23	8	45.2	13
Oct. 5.9	35.24	20	39.7	37	18.65	12	44.6	4	25.62	14	50.5	31	35.35	12	43.7	15
15.9	35.53	29	36.1	36	18.81	16	44.5	1	25.81	19	47.3	32	35.51	16	41.9	18
25.9	35.91	38	32.6	35	19.01	20	44.7	2	26.06	25	44.1	32	35.70	19	39.9	20
Nov. 4.9	36.37	46	29.3	33	19.26	25	45.3	6	26.36	30	41.0	31	35.93	23	37.8	21
14.8	36.91	54	26.3	30	19.55	29	46.3	10	26.71	35	38.0	30	36.20	27	35.6	22
24.8	37.51	60	23.6	27	19.87	32	47.6	13	27.10	39	35.3	27	36.51	31	33.3	23
Dec. 4.8	38.16	65	21.3	23	20.21	34	49.3	17	27.53	43	32.8	25	36.84	33	31.0	23
14.8	38.85	69	19.6	17	20.56	35	51.3	20	27.98	45	30.7	21	37.18	34	28.7	23
24.7	39.56	71	18.5	11	20.91	35	53.5	22	28.44	46	29.1	16	37.53	35	26.5	22
34.7	40.26	70	17.9	6	21.25	34	55.9	24	28.89	45	27.9	12	37.88	35	24.5	20
Sec δ, Tan δ	2.584		+2.382		1.051		−0.322		1.502		+1.121		1.036		+0.269	
Mean Place	$34^{s}.525$		55″.17		$18^{s}.041$		41″.22		$24^{s}.548$		62″.54		$34^{s}.341$		50″.52	
$D'_{\psi}\alpha$, $D_{\omega}\alpha$	+0.01		+0.16		0.00		−0.02		0.00		+0.07		0.00		+0.02	
$D_{\psi}\delta$, $D_{\omega}\delta$	−0.4		+0.1		−0.4		+0.1		−0.4		+0.1		−0.4		+0.1	

Mean Solar Date.	β Virginis. Mag. 3.8				Groombridge 1830. Mag. 6.5				γ Ursæ Majoris. Mag. 2.5				π Virginis. Mag. 4.6			
	Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination N.	
	h m 11 46		° ′ + 2 15		h m 11 47		° ′ +38 20		h m 11 49		° ′ +54 10		h m 11 56		° ′ + 7 5	
	s		″		s		″		s		″		s		″	
Jan. 0.7	6.55		39.8		54.98		50.9		13.21		48.8		21.66		77.3	
10.7	6.88	33	37.7	21	55.38	40	49.6	13	13.71	50	48.1	7	21.99	33	75.3	20
20.7	7.19	31	35.7	20	55.76	38	48.8	8	14.18	47	48.0	1	22.30	31	73.5	18
30.6	7.47	28	33.9	18	56.11	35	48.4	4	14.60	42	48.4	4	22.59	29	71.9	16
Feb. 9.6	7.71	24	32.4	15	56.41	30	48.5	1	14.97	37	49.4	10	22.84	25	70.6	13
19.6	7.91	20	31.2	12	56.67	26	49.0	5	15.28	31	50.8	14	23.05	21	69.6	10
29.6	8.06	15	30.3	9	56.87	20	50.0	10	15.52	24	52.6	18	23.22	17	68.9	7
Mar. 10.5	8.17	11	29.6	7	57.01	14	51.3	13	15.68	16	54.8	22	23.34	12	68.5	4
20.5	8.25	8	29.2	4	57.09	8	52.8	15	15.76	8	57.2	24	23.42	8	68.4	1
30.5	8.28	3	29.0	2	57.13	4	54.5	17	15.77	1	59.7	25	23.46	4	68.5	1
Apr. 9.4	8.28	0	29.0	0	57.12	1	56.2	17	15.72	5	62.2	25	23.47	1	68.8	3
19.4	8.26	2	29.2	2	57.07	5	57.9	17	15.62	10	64.5	23	23.45	2	69.3	5
29.4	8.21	5	29.6	4	56.99	8	59.5	16	15.47	15	66.6	21	23.41	4	69.9	6
May 9.4	8.15	6	30.0	4	56.89	10	61.0	15	15.29	18	68.5	19	23.35	6	70.5	6
19.3	8.07	8	30.5	5	56.77	12	62.2	12	15.08	21	70.1	16	23.28	7	71.2	7
29.3	7.98	9	31.0	5	56.64	13	63.2	10	14.85	23	71.2	11	23.20	8	71.9	7
June 8.3	7.89	9	31.6	6	56.50	14	63.8	6	14.62	23	71.9	7	23.11	9	72.6	7
18.3	7.80	9	32.2	6	56.36	14	64.1	3	14.38	24	72.2	3	23.01	10	73.2	6
28.2	7.72	8	32.8	6	56.23	13	64.1	0	14.15	23	72.0	2	22.92	9	73.7	5
July 8.2	7.64	8	33.3	5	56.11	12	63.7	4	13.94	21	71.4	6	22.83	9	74.2	5
18.2	7.56	8	33.8	5	56.00	11	63.0	7	13.74	20	70.3	11	22.75	8	74.6	4
28.1	7.49	7	34.2	4	55.90	10	61.9	11	13.57	17	68.8	15	22.68	7	74.9	3
Aug. 7.1	7.44	5	34.6	4	55.82	8	60.5	14	13.43	14	66.9	19	22.62	6	75.0	1
17.1	7.40	4	34.8	2	55.77	5	58.8	17	13.32	11	64.7	22	22.57	5	75.0	0
27.1	7.39	1	34.8	0	55.74	3	56.8	20	13.25	7	62.1	26	22.55	2	74.8	2
Sept. 6.0	7.40	1	34.7	1	55.75	1	54.5	23	13.23	2	59.3	28	22.55	0	74.4	4
16.0	7.44	4	34.4	3	55.80	5	52.0	25	13.25	2	56.2	31	22.58	3	73.8	6
26.0	7.52	8	33.8	6	55.89	9	49.3	27	13.33	8	53.0	32	22.65	7	73.0	8
Oct. 6.0	7.64	12	33.0	8	56.02	13	46.4	29	13.47	14	49.7	33	22.75	10	71.9	11
15.9	7.79	15	32.0	10	56.20	18	43.4	30	13.66	19	46.3	34	22.89	14	70.6	13
25.9	7.98	19	30.7	13	56.42	22	40.3	31	13.92	26	42.9	34	23.07	18	69.0	16
Nov. 4.9	8.21	23	29.2	15	56.69	27	37.2	31	14.24	32	39.6	33	23.30	23	67.2	18
14.8	8.48	27	27.4	18	57.01	32	34.2	30	14.61	37	36.5	31	23.56	26	65.2	20
24.8	8.78	30	25.4	20	57.36	35	31.3	29	15.04	43	33.6	29	23.85	29	63.1	21
Dec. 4.8	9.10	32	23.3	21	57.74	38	28.6	27	15.50	46	31.1	25	24.17	32	60.9	22
14.8	9.44	34	21.1	22	58.15	41	26.2	24	15.99	49	29.0	21	24.51	34	58.6	23
24.7	9.79	35	18.8	23	58.57	42	24.1	21	16.49	50	27.4	16	24.86	35	56.4	22
34.7	10.13	34	16.6	22	58.98	41	22.5	16	16.99	50	26.4	10	25.20	34	54.3	21
Sec δ, Tan δ	1.001		+0.039		1.275		+0.791		1.709		+1.386		1.008		+0.125	
Mean Place	6ˢ.685		38″.58		54ˢ.671		61″.11		12ˢ.502		62″.57		21ˢ.809		78″.10	
D′ψ α, Dω α	0.00		0.00		0.00		+0.05		0.00		+0.09		0.00		+0.01	
Dψ δ, Dω δ	−0.4		+0.1		−0.4		+0.1		−0.4		0.0		−0.4		0.0	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	o Virginis. Mag. 4.2				δ Centauri. Mag. 2.9				ε Corvi. Mag. 3.2				4 H. Draconis. Mag. 5.1			
	Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination S.		Right Ascension.		Declination N.	
	h m 12 0 s		° ' + 9 12 "		h m 12 3 s		° ' −50 13 "		h m 12 5 s		° ' −22 7 "		h m 12 8 s		° ' +78 5 "	
Jan. 0.7	43.47		76.3		46.75		39.3		35.34		40.3		8.20		61.3	
10.7	43.80	33	74.3	20	47.19	44	41.7	24	35.68	34	42.7	24	9.40	120	61.1	2
20.7	44.12	32	72.5	18	47.60	41	44.4	27	36.01	33	45.2	25	10.55	115	61.5	4
30.6	44.41	29	71.0	15	47.97	37	47.4	30	36.31	30	47.7	25	11.62	107	62.5	10
Feb. 9.6	44.66	25	69.8	12	48.30	33	50.6	32	36.57	26	50.2	25	12.56	94	64.1	16
19.6	44.88	22	68.9	9	48.57	27	53.9	33	36.79	22	52.6	24	13.34	78	66.2	21
29.6	45.05	17	68.4	5	48.78	21	57.3	34	36.96	17	54.9	23	13.95	61	68.7	25
Mar. 10.5	45.17	12	68.1	3	48.93	15	60.6	33	37.09	13	57.0	21	14.36	41	71.5	28
20.5	45.26	9	68.1	0	49.03	10	63.8	32	37.18	9	58.8	18	14.57	21	74.5	30
30.5	45.31	5	68.4	3	49.07	4	66.8	30	37.23	5	60.5	17	14.58	1	77.5	30
Apr. 9.5	45.32	1	68.8	4	49.06	1	69.7	29	37.25	2	61.9	14	14.39	19	80.4	29
19.4	45.30	2	69.4	6	49.01	5	72.3	26	37.24	1	63.0	11	14.03	36	83.2	28
29.4	45.26	4	70.1	7	48.93	8	74.5	22	37.20	4	63.9	9	13.51	52	85.7	25
May 9.4	45.20	6	70.9	8	48.81	12	76.4	19	37.14	6	64.6	7	12.87	64	87.8	21
19.3	45.13	7	71.7	8	48.66	15	77.9	15	37.07	7	65.0	4	12.12	75	89.4	16
29.3	45.05	8	72.4	7	48.49	17	79.1	12	36.98	9	65.2	2	11.29	83	90.6	12
June 8.3	44.96	9	73.1	7	48.30	19	79.8	7	36.88	10	65.1	1	10.42	87	91.2	6
18.3	44.86	10	73.7	6	48.09	21	80.1	3	36.78	10	64.8	3	9.53	89	91.2	0
28.2	44.77	9	74.3	6	47.88	21	79.9	2	36.67	11	64.3	5	8.64	89	90.7	5
July 8.2	44.68	9	74.7	4	47.67	21	79.3	6	36.56	11	63.6	7	7.78	86	89.7	10
18.2	44.60	8	75.0	3	47.47	20	78.3	10	36.46	10	62.7	9	6.98	80	88.1	16
28.2	44.52	8	75.2	2	47.27	20	77.0	13	36.36	10	61.7	10	6.25	73	86.1	20
Aug. 7.1	44.46	6	75.3	1	47.10	17	75.3	17	36.28	8	60.6	11	5.60	65	83.6	25
17.1	44.41	5	75.2	1	46.96	14	73.3	20	36.21	7	59.4	12	5.06	54	80.7	29
27.1	44.38	3	74.9	3	46.85	11	71.2	21	36.17	4	58.2	12	4.64	42	77.5	32
Sept. 6.0	44.38	0	74.3	6	46.79	6	68.9	23	36.15	2	57.0	12	4.35	29	74.0	35
16.0	44.40	2	73.6	7	46.78	1	66.6	23	36.16	1	55.9	11	4.20	15	70.3	37
26.0	44.46	6	72.7	9	46.83	5	64.3	23	36.21	5	55.0	9	4.20	0	66.5	38
Oct. 6.0	44.56	10	71.5	12	46.94	11	62.2	21	36.31	10	54.3	7	4.36	16	62.6	39
15.9	44.70	14	70.1	14	47.12	18	60.4	18	36.45	14	53.9	4	4.68	32	58.7	39
25.9	44.88	18	68.4	17	47.36	24	58.9	15	36.64	19	53.8	1	5.17	49	55.0	37
Nov. 4.9	45.10	22	66.5	19	47.67	31	57.8	11	36.87	23	54.1	3	5.81	64	51.5	35
14.9	45.36	26	64.5	20	48.03	36	57.2	6	37.14	27	54.8	7	6.60	79	48.2	33
24.8	45.65	29	62.3	22	48.44	41	57.2	0	37.45	31	55.9	11	7.53	93	45.3	29
Dec. 4.8	45.97	32	60.0	23	48.88	44	57.7	5	37.79	34	57.3	14	8.57	104	42.8	25
14.8	46.30	33	57.7	23	49.34	46	58.8	11	38.14	35	59.1	18	9.70	113	40.9	19
24.7	46.65	35	55.5	22	49.81	47	60.4	16	38.50	36	61.1	20	10.88	118	39.6	13
34.7	46.99	34	53.4	21	50.28	47	62.4	20	38.86	36	63.4	23	12.09	121	38.9	7
Sec δ, Tan δ	1.013		+0.162		1.563		−1.202		1.080		−0.407		4.850		+4.746	
Mean Place	43ˢ.622		78″.01		47ˢ.512		56″.83		35ˢ.801		49″.41		5ˢ.409		78″.78	
D′ψ α, Dω α	0.00		+0.01		0.00		−0.08		0.00		−0.03		0.00		+0.32	
Dψ δ, Dω δ	−0.4		0.0		−0.4		0.0		−0.4		0.0		−0.4		0.0	

Mean Solar Date.	δ Crucis. Mag. 3.1				δ Ursæ Majoris. Mag. 3.4				γ Corvi. Mag. 2.8				2 Canum Venat. Mag. 5.8			
	Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination N.	
	h m		° ′		h m		° ′		h m		° ′		h m		°	
	12 10		−58 15		12 11		+57 30		12 11		−17 3		12 11		+41	
	s		″		s		″		s		″		s		″	
Jan. 0.7	27.19		15.9		5.33		62.2		16.24		4.7		43.47		47.7	
10.7	27.71	52	18.1	22	5.86	53	61.4	8	16.58	34	7.0	23	43.89	42	46.4	
20.7	28.20	49	20.7	26	6.37	51	61.1	3	16.90	32	9.3	23	44.28	39	45.6	
30.6	28.64	44	23.7	30	6.84	47	61.4	3	17.20	30	11.7	24	44.64	36	45.3	
Feb. 9.6	29.02	38	26.9	32	7.26	42	62.3	9	17.46	26	14.0	23	44.96	32	45.5	
19.6	29.34	32	30.3	34	7.62	36	63.7	14	17.68	22	16.2	22	45.24	28	46.2	
29.6	29.59	25	33.8	35	7.90	28	65.6	19	17.86	18	18.2	20	45.46	22	47.3	
Mar. 10.5	29.77	18	37.4	36	8.10	20	67.8	22	18.00	14	20.0	18	45.62	16	48.8	
20.5	29.88	11	40.9	35	8.23	13	70.2	24	18.09	9	21.6	16	45.73	11	50.6	
30.5	29.93	5	44.2	33	8.28	5	72.8	26	18.15	6	22.9	13	45.78	5	52.6	
Apr. 9.5	29.93	0	47.4	32	8.26	2	75.5	27	18.18	3	24.0	11	45.79	1	54.6	
19.4	29.87	6	50.3	29	8.17	9	78.0	25	18.17	1	24.9	9	45.75	4	56.7	
29.4	29.76	11	52.9	26	8.03	14	80.4	24	18.14	3	25.6	7	45.68	7	58.7	
May 9.4	29.61	15	55.2	23	7.85	18	82.5	21	18.09	5	26.0	4	45.58	10	60.5	
19.3	29.42	19	57.1	19	7.63	22	84.3	18	18.03	6	26.2	2	45.45	13	62.1	
29.3	29.19	23	58.6	15	7.38	25	85.6	13	17.95	8	26.2	0	45.31	14	63.5	
June 8.3	28.94	25	59.6	10	7.12	26	86.5	9	17.86	9	26.0	2	45.16	15	64.5	
18.3	28.68	26	60.1	5	6.85	27	87.0	5	17.76	10	25.7	3	45.00	16	65.1	6
28.2	28.40	28	60.2	1	6.58	27	87.0	0	17.66	10	25.2	5	44.84	16	65.4	3
July 8.2	28.12	28	59.8	4	6.32	26	86.5	5	17.56	10	24.5	7	44.69	15	65.3	1
18.2	27.84	28	58.9	9	6.07	25	85.5	10	17.46	10	23.7	8	44.54	15	64.8	5
28.2	27.58	26	57.6	13	5.85	22	84.1	14	17.37	9	22.8	9	44.41	13	63.9	9
Aug. 7.1	27.34	24	56.0	16	5.65	20	82.3	18	17.29	8	21.9	9	44.29	12	62.7	12
17.1	27.14	20	54.0	20	5.49	16	80.1	22	17.22	7	20.9	10	44.20	9	61.2	15
27.1	26.98	16	51.7	23	5.37	12	77.5	26	17.18	4	19.9	10	44.13	7	59.3	19
Sept. 6.0	26.88	10	49.2	25	5.29	8	74.6	29	17.16	2	19.0	9	44.10	3	57.1	22
16.0	26.84	4	46.6	26	5.27	2	71.5	31	17.17	1	18.2	8	44.10	0	54.6	25
26.0	26.88	4	44.1	25	5.31	4	68.1	34	17.22	5	17.6	6	44.14	4	51.9	27
Oct. 6.0	26.99	11	41.7	24	5.41	10	64.6	35	17.31	9	17.2	4	44.23	9	49.0	29
15.9	27.18	19	39.5	22	5.57	16	61.0	36	17.44	13	17.1	1	44.37	14	46.0	3
25.9	27.45	27	37.6	19	5.80	23	57.5	35	17.61	17	17.3	2	44.56	19	42.9	31
Nov. 4.9	27.79	34	36.2	14	6.10	30	54.1	34	17.83	22	17.8	5	44.80	24	39.8	3
14.9	28.21	42	35.2	10	6.46	36	50.8	33	18.09	26	18.7	9	45.09	29	36.7	3
24.8	28.68	47	34.8	4	6.88	42	47.7	31	18.39	30	19.9	12	45.42	33	33.7	3
Dec. 4.8	29.19	51	35.0	2	7.35	47	45.0	27	18.72	33	21.5	16	45.79	37	31.0	2
14.8	29.73	54	35.8	8	7.86	51	42.7	23	19.06	34	23.4	19	46.19	40	28.6	2
24.7	30.27	54	37.1	13	8.39	53	40.9	18	19.41	35	25.5	21	46.60	41	26.5	2
34.7	30.81	54	39.0	19	8.93	54	39.6	13	19.77	36	27.7	22	47.02	42	24.9	1
Sec δ, Tan δ	1.901		−1.617		1.862		+1.571		1.046		−0.307		1.328		+0.874	
Mean Place	28ˢ.190		35″.01		4ˢ.692		77″.58		16ˢ.696		11″.81		43ˢ.275		59″.59	
D′ψ a, Dω a	0.00		−0.11		0.00		+0.10		0.00		−0.02		0.00		+0.06	
Dψ δ, Dω δ	−0.4		0.0		−0.4		0.0		−0.4		0.0		−0.4		−0.1	

Mean Solar Date.	β Chamæleontis. Mag. 4.4				η Virginis. Mag. 4.0				α¹ Crucis. Mag. 1.6				20 Comæ. Mag. 5.7			
	Right Ascension.		Declination S.		Right Ascension.		Declination S.		Right Ascension.		Declination S.		Right Ascension.		Declination N.	
	h m 12 13		° ′ −78 49		h m 12 15		° ′ − 0 10		h m 12 21		° ′ −62 36		h m 12 25		° ′ +21 22	
	s		″		s		″		s		″		s		″	
Jan. 0.7	7.21		2.8		23.89		39.1		40.34		21.8		17.95		53.3	
10.7	8.42	121	4.6	18	24.23	34	41.2	21	40.93	59	23.8	20	18.31	36	51.4	19
20.7	9.54	112	6.9	23	24.55	32	43.3	21	41.48	55	26.3	25	18.65	34	49.9	15
30.7	10.56	102	9.7	28	24.84	29	45.2	19	41.99	51	29.1	28	18.96	31	48.7	12
Feb. 9.6	11.44	88	12.9	32	25.10	26	46.8	16	42.43	44	32.2	31	19.25	29	48.0	7
19.6	12.16	72	16.4	35	25.32	22	48.2	14	42.80	37	35.6	34	19.49	24	47.7	3
29.6	12.72	56	20.1	37	25.50	18	49.3	11	43.10	30	39.2	36	19.69	20	47.8	1
Mar. 10.5	13.11	39	24.0	39	25.64	14	50.1	8	43.33	23	42.8	36	19.85	16	48.3	5
20.5	13.32	21	27.9	39	25.74	10	50.7	6	43.48	15	46.4	36	19.97	12	49.0	7
30.5	13.37	5	31.8	39	25.80	6	51.0	3	43.55	7	49.9	35	20.04	7	49.9	9
Apr. 9.5	13.25	12	35.5	37	25.83	3	51.1	1	43.56	1	53.2	33	20.07	3	51.0	11
19.4	12.97	28	39.0	35	25.83	0	51.0	1	43.51	5	56.3	31	20.07	0	52.3	13
29.4	12.55	42	42.3	33	25.81	2	50.8	2	43.40	11	59.1	28	20.04	3	53.6	13
May 9.4	12.00	55	45.2	29	25.77	4	50.4	4	43.23	17	61.6	25	19.99	5	54.9	13
19.4	11.33	67	47.8	26	25.71	6	50.0	4	43.02	21	63.8	22	19.92	7	56.1	12
29.3	10.56	77	49.9	21	25.63	8	49.5	5	42.77	25	65.5	17	19.84	8	57.2	11
June 8.3	9.70	86	51.5	16	25.55	8	48.9	6	42.48	29	66.7	12	19.74	10	58.2	10
18.3	8.78	92	52.6	11	25.47	8	48.3	6	42.17	31	67.5	8	19.64	10	59.0	8
28.2	7.83	95	53.2	6	25.38	9	47.7	6	41.84	33	67.8	3	19.53	11	59.6	6
July 8.2	6.86	97	53.2	0	25.29	9	47.1	6	41.50	34	67.6	2	19.42	11	59.9	3
18.2	5.91	95	52.7	5	25.20	9	46.6	5	41.17	33	66.9	7	19.32	10	60.0	1
28.2	5.01	90	51.6	11	25.11	9	46.1	5	40.85	32	65.8	11	19.23	9	59.9	1
Aug. 7.1	4.19	82	50.0	16	25.04	7	45.7	4	40.55	30	64.2	16	19.14	9	59.5	4
17.1	3.47	72	47.9	21	24.98	6	45.4	3	40.29	26	62.3	19	19.06	8	58.8	7
27.1	2.89	58	45.5	24	24.94	4	45.3	1	40.08	21	60.0	23	19.01	5	57.9	9
Sept. 6.1	2.47	42	42.8	27	24.92	2	45.3	0	39.93	15	57.5	25	18.98	3	56.8	11
16.0	2.24	23	39.9	29	24.93	1	45.4	1	39.86	7	54.9	26	18.98	0	55.4	14
26.0	2.21	3	37.0	29	24.98	5	45.8	4	39.87	1	52.3	26	19.01	3	53.7	17
Oct. 6.0	2.38	17	34.0	30	25.06	8	46.4	6	39.96	9	49.7	26	19.08	7	51.8	19
15.9	2.77	39	31.2	28	25.18	12	47.3	9	40.15	19	47.3	24	19.19	11	49.7	21
25.9	3.36	59	28.7	25	25.35	17	48.5	12	40.43	28	45.2	21	19.35	16	47.4	23
Nov. 4.9	4.15	79	26.6	21	25.56	21	49.9	14	40.80	37	43.5	17	19.55	20	45.0	24
14.9	5.11	96	24.9	17	25.81	25	51.5	16	41.24	44	42.3	12	19.79	24	42.4	26
24.8	6.20	109	23.8	11	26.09	28	53.4	19	41.75	51	41.6	7	20.08	29	39.8	26
Dec. 4.8	7.40	120	23.3	5	26.40	31	55.5	21	42.31	56	41.5	1	20.40	32	37.2	26
14.8	8.66	126	23.4	1	26.73	33	57.7	22	42.91	60	42.0	5	20.74	34	34.7	25
24.8	9.93	127	24.2	8	27.07	34	59.9	22	43.52	61	43.1	11	21.09	35	32.4	23
34.7	11.19	126	25.6	14	27.42	35	62.1	22	44.12	60	44.7	16	21.45	36	30.4	20
Sec δ, Tan δ	5.160		−5.062		1.000		−0.003		2.174		−1.930		1.074		+0.392	
Mean Place	$9^{s}.591$		$24''.96$		$24^{s}.221$		$40''.17$		$41^{s}.623$		$41''.45$		$18^{s}.125$		$59''.97$	
$D'_\psi\alpha$, $D_\omega\alpha$	+0.01		−0.34		0.00		0.00		0.00		−0.13		0.00		+0.03	
$D_\psi\delta$, $D_\omega\delta$	−0.4		−0.1		−0.4		−0.1		−0.4		−0.1		−0.4		−0.1	

Mean Solar Date.	δ Corvi. Mag. 3.1				γ Crucis. Mag. 1.6				8 Canum Venat. Mag. 4.3				κ Draconis. Mag. 3.9			
	Right Ascension.		Declination S.		Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination N.	
	h m 12 25		° ′ −16 1		h m 12 26		° ′ −56 36		h m 12 29		° ′ +41 49		h m 12 29		° ′ +70 15	
	s		″		s		″		s		″		s		″	
Jan. 0.7	18.03		25.8		15.37		55.1		34.13		55.1		45.17		65.8	
10.7	18.37	34	28.1	23	15.88	51	57.1	20	34.54	41	53.6	15	45.95	78	65.0	8
20.7	18.70	33	30.4	23	16.36	48	59.6	25	34.94	40	52.6	10	46.70	75	64.9	1
30.7	19.00	30	32.7	23	16.81	45	62.4	28	35.32	38	52.2	4	47.41	71	65.4	5
Feb. 9.6	19.27	27	34.9	22	17.21	40	65.5	31	35.66	34	52.3	1	48.05	64	66.6	12
19.6	19.51	24	37.0	21	17.54	33	68.8	33	35.95	29	53.0	7	48.61	56	68.3	17
29.6	19.70	19	39.0	20	17.81	27	72.2	34	36.19	24	54.1	11	49.06	45	70.4	21
Mar. 10.6	19.85	15	40.7	17	18.02	21	75.6	34	36.37	18	55.5	14	49.39	33	72.9	25
20.5	19.96	11	42.2	15	18.17	15	79.0	34	36.50	13	57.3	18	49.60	21	75.7	28
30.5	20.03	7	43.5	13	18.25	8	82.3	33	36.58	8	59.3	20	49.69	9	78.6	29
Apr. 9.5	20.07	4	44.6	11	18.28	3	85.5	32	36.60	2	61.4	21	49.66	3	81.6	30
19.4	20.08	1	45.4	8	18.26	2	88.4	29	36.58	2	63.6	22	49.52	14	84.4	28
29.4	20.07	1	46.0	6	18.19	7	91.0	26	36.53	5	65.7	21	49.28	24	87.0	26
May 9.4	20.03	4	46.4	4	18.07	12	93.3	23	36.44	9	67.7	20	48.96	32	89.3	23
19.4	19.97	6	46.6	2	17.91	16	95.3	20	36.32	12	69.5	18	48.57	39	91.3	20
29.3	19.90	7	46.6	0	17.72	19	96.9	16	36.18	14	71.0	15	48.13	44	92.8	15
June 8.3	19.82	8	46.5	1	17.50	22	98.0	11	36.03	15	72.1	11	47.65	48	93.8	10
18.3	19.73	9	46.2	3	17.26	24	98.7	7	35.87	16	72.9	8	47.15	50	94.3	5
28.3	19.63	10	45.7	5	17.01	25	98.9	2	35.70	17	73.4	5	46.64	51	94.2	1
July 8.2	19.53	10	45.1	6	16.75	26	98.6	3	35.54	16	73.5	1	46.14	50	93.6	6
18.2	19.43	10	44.4	7	16.48	27	97.9	7	35.38	16	73.1	4	45.66	48	92.5	11
28.2	19.33	10	43.6	8	16.23	25	96.8	11	35.23	15	72.3	8	45.21	45	90.9	16
Aug. 7.1	19.24	9	42.7	9	16.00	23	95.3	15	35.09	14	71.2	11	44.81	40	88.9	20
17.1	19.17	7	41.8	9	15.80	20	93.4	19	34.97	12	69.7	15	44.46	35	86.4	25
27.1	19.11	6	40.9	9	15.63	17	91.3	21	34.88	9	67.9	18	44.17	29	83.6	28
Sept. 6.1	19.08	3	40.1	8	15.51	12	89.0	23	34.82	6	65.8	21	43.95	22	80.4	32
16.0	19.08	0	39.4	7	15.45	6	86.6	24	34.80	2	63.3	25	43.82	13	76.9	35
26.0	19.11	3	38.8	6	15.46	1	84.1	25	34.81	1	60.6	27	43.77	5	73.3	36
Oct. 6.0	19.19	8	38.5	3	15.54	8	81.7	24	34.87	6	57.7	29	43.82	5	69.5	38
16.0	19.31	12	38.4	1	15.70	16	79.5	22	34.99	12	54.7	30	43.97	15	65.6	39
25.9	19.47	16	38.6	2	15.94	24	77.7	18	35.15	16	51.5	32	44.23	26	61.8	38
Nov. 4.9	19.68	21	39.2	6	16.25	31	76.2	15	35.36	21	48.3	32	44.59	36	58.1	37
14.9	19.93	25	40.1	9	16.64	39	75.1	11	35.63	27	45.1	32	45.06	47	54.6	35
24.8	20.21	28	41.3	12	17.08	44	74.6	5	35.95	32	42.0	31	45.62	56	51.4	32
Dec. 4.8	20.53	32	42.9	16	17.56	48	74.7	1	36.30	35	39.2	28	46.26	64	48.6	28
14.8	20.87	34	44.7	18	18.08	52	75.3	6	36.69	39	36.6	26	46.96	70	46.3	23
24.8	21.22	35	46.7	20	18.61	53	76.5	12	37.10	41	34.4	22	47.71	75	44.5	18
34.7	21.57	35	48.9	22	19.13	52	78.2	17	37.51	41	32.6	18	48.48	77	43.3	12
Sec δ, Tan δ	1.040		−0.287		1.818		−1.519		1.342		+0.895		2.962		+2.788	
Mean Place	$18^{s}.559$		$32''.13$		$16^{s}.512$		$73''.37$		$34^{s}.056$		$67''.81$		$44^{s}.035$		$83''.58$	
$D'_{\psi}\alpha$, $D_{\omega}\alpha$	0.00		−0.02		0.00		−0.10		0.00		+0.06		−0.01		+0.18	
$D_{\psi}\delta$, $D_{\omega}\delta$	−0.4		−0.1		−0.4		−0.1		−0.4		−0.1		−0.4		−0.1	

APPARENT PLACES OF STARS, 1912.

FOR THE UPPER TRANSIT AT WASHINGTON.

ean Solar Date.	β Corvi. Mag. 2.8				24 Comæ *seq.* Mag. 5.2				α Muscæ. Mag. 2.9				χ Virginis. Mag. 4.8			
	Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination S.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	12 29		−22 54		12 30		+18 51		12 31		−68 38		12 34		− 7 30	
	s		″		s		″		s		″		s		″	
n. 0.7	45.04		28.1		42.74		34.7		53.63		42.4		41.66		38.1	
10.7	45.40	36	30.4	23	43.10	36	32.8	19	54.35	72	44.2	18	42.00	34	40.3	22
20.7	45.74	34	32.8	24	43.44	34	31.2	16	55.03	68	46.4	22	42.33	33	42.5	22
30.7	46.06	32	35.2	24	43.75	31	29.9	13	55.66	63	49.1	27	42.63	30	44.6	21
b. 9.6	46.34	28	37.7	25	44.04	29	29.0	9	56.22	56	52.1	30	42.90	27	46.5	19
19.6	46.58	24	40.1	24	44.28	24	28.5	5	56.69	47	55.4	33	43.14	24	48.2	17
29.6	46.78	20	42.3	22	44.48	20	28.4	1	57.08	39	59.0	36	43.34	20	49.7	15
ar. 10.6	46.94	16	44.4	21	44.64	16	28.7	3	57.38	30	62.7	37	43.50	16	51.0	13
20.5	47.06	12	46.3	19	44.76	12	29.3	6	57.58	20	66.4	37	43.62	12	52.0	10
30.5	47.14	8	48.0	17	44.84	8	30.1	8	57.69	11	70.1	37	43.70	8	52.8	8
r. 9.5	47.18	4	49.4	14	44.88	4	31.1	10	57.72	3	73.6	35	43.75	5	53.3	5
19.4	47.19	1	50.6	12	44.89	1	32.3	12	57.66	6	77.0	34	43.77	2	53.6	3
29.4	47.18	1	51.6	10	44.87	2	33.5	12	57.52	14	80.1	31	43.76	1	53.7	1
ay 9.4	47.14	4	52.4	8	44.82	5	34.7	12	57.31	21	82.9	28	43.73	3	53.7	0
19.4	47.09	5	52.9	5	44.76	6	35.8	11	57.04	27	85.3	24	43.69	4	53.6	1
29.3	47.02	7	53.2	3	44.68	8	36.9	11	56.72	32	87.3	20	43.63	6	53.3	3
ne 8.3	46.93	9	53.3	1	44.59	9	37.9	10	56.35	37	88.9	16	43.55	8	52.9	4
18.3	46.83	10	53.1	2	44.49	10	38.7	8	55.94	41	90.0	11	43.47	8	52.4	5
28.3	46.72	11	52.7	4	44.39	10	39.3	6	55.50	44	90.5	5	43.38	9	51.9	5
ly 8.2	46.61	11	52.1	6	44.28	11	39.7	4	55.04	46	90.5	0	43.28	10	51.3	6
18.2	46.50	11	51.4	7	44.18	10	39.9	2	54.59	45	90.0	5	43.18	10	50.7	6
28.2	46.39	11	50.5	9	44.08	10	39.9	0	54.15	44	89.1	9	43.09	9	50.1	6
g. 7.1	46.29	10	49.5	10	43.99	9	39.6	3	53.74	41	87.6	15	43.01	8	49.5	6
17.1	46.21	8	48.4	11	43.92	7	39.1	5	53.37	37	85.7	19	42.94	7	48.9	6
27.1	46.14	7	47.2	12	43.86	6	38.4	7	53.06	31	83.5	22	42.88	6	48.4	5
pt. 6.1	46.10	4	46.1	11	43.83	3	37.4	10	52.83	23	81.0	25	42.84	4	48.0	4
16.0	46.09	1	45.0	11	43.83	0	36.1	13	52.69	14	78.3	27	42.83	1	47.8	2
26.0	46.12	3	44.0	10	43.86	3	34.6	15	52.66	3	75.5	28	42.86	3	47.7	1
t. 6.0	46.19	7	43.3	7	43.92	6	32.9	17	52.74	8	72.8	27	42.92	6	47.9	2
16.0	46.31	12	42.8	5	44.02	10	30.9	20	52.94	20	70.2	26	43.03	11	48.3	4
25.9	46.48	17	42.6	2	44.17	15	28.7	22	53.25	31	67.8	24	43.18	15	49.0	7
v. 4.9	46.69	21	42.8	2	44.36	19	26.3	24	53.67	42	65.8	20	43.37	19	50.0	10
14.9	46.94	25	43.3	5	44.60	24	23.8	25	54.19	52	64.3	15	43.60	23	51.3	13
24.8	47.24	30	44.2	9	44.88	28	21.3	25	54.80	61	63.3	10	43.88	28	52.9	16
c. 4.8	47.57	33	45.5	13	45.19	31	18.8	25	55.48	68	62.8	5	44.19	31	54.7	18
14.8	47.92	35	47.1	16	45.53	34	16.3	25	56.20	72	63.0	2	44.52	33	56.7	20
24.8	48.28	36	49.0	19	45.88	35	14.0	23	56.94	74	63.8	8	44.86	34	58.8	21
34.7	48.64	36	51.2	22	46.23	35	11.8	22	57.68	74	65.2	14	45.20	34	61.0	22
, Tan δ	1.086		−0.423		1.057		+0.342		2.747		−2.558		1.009		−0.132	
n Place	45ˢ.678		36″.72		42ˢ.978		40″.76		55ˢ.368		62″.78		42ˢ.168		41″.11	
a, D∞ α	0.00		−0.03		0.00		+0.02		+0.01		−0.17		0.00		−0.01	
, D∞ δ	−0.4		−0.1		−0.4		−0.1		−0.4		−0.1		−0.4		−0.2	

Mean Solar Date.	γ Centauri. Mag. 2.4				γ Virginis (*mean*). Mag. 2.9				ρ Virginis. Mag. 5.0				76 Ursæ Majoris. Mag. 5.9			
	Right Ascension.		Declination S.		Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination N.	
	h m 12 36 s		° ′ −48 28 ″		h m 12 37 s		° ′ − 0 58 ″		h m 12 37 s		° ′ +10 42 ″		h m 12 37 s		° ′ +63 11 ″	
Jan. 0.7	38.42		20.0		11.63		0.1		25.50		69.8		44.08		28.6	
10.7	38.87	45	22.0	20	11.97	34	2.3	22	25.85	35	67.7	21	44.69	61	27.6	10
20.7	39.30	43	24.4	24	12.29	32	4.4	21	26.18	33	65.8	19	45.28	59	27.1	5
30.7	39.70	40	27.1	27	12.59	30	6.3	19	26.49	31	64.3	15	45.84	56	27.3	2
Feb. 9.6	40.06	36	30.0	29	12.86	27	8.0	17	26.77	28	63.1	12	46.35	51	28.1	8
19.6	40.37	31	33.1	31	13.10	24	9.4	14	27.01	24	62.2	9	46.80	45	29.5	14
29.6	40.62	25	36.2	31	13.30	20	10.6	12	27.22	21	61.6	6	47.17	37	31.4	19
Mar. 10.6	40.82	20	39.4	32	13.46	16	11.5	9	27.38	16	61.4	2	47.45	28	33.7	23
20.5	40.97	15	42.5	31	13.58	12	12.1	6	27.50	12	61.5	1	47.64	19	36.3	26
30.5	41.07	10	45.4	29	13.67	9	12.4	3	27.59	9	61.8	3	47.74	10	39.0	27
Apr. 9.5	41.12	5	48.2	28	13.72	5	12.5	1	27.64	5	62.4	6	47.75	1	41.8	28
19.4	41.13	1	50.8	26	13.74	2	12.5	0	27.66	2	63.1	7	47.68	7	44.6	28
29.4	41.09	4	53.1	23	13.74	0	12.3	2	27.65	1	63.9	8	47.54	14	47.2	26
May 9.4	41.02	7	55.1	20	13.71	3	12.0	3	27.62	3	64.8	9	47.34	20	49.6	24
19.4	40.92	10	56.8	17	13.66	5	11.5	5	27.57	5	65.8	10	47.08	26	51.6	20
29.3	40.79	13	58.1	13	13.60	6	11.0	5	27.50	7	66.7	9	46.78	30	53.2	16
June 8.3	40.64	15	59.1	10	13.52	8	10.4	6	27.42	8	67.5	8	46.46	32	54.4	12
18.3	40.47	17	59.7	6	13.44	8	9.8	6	27.33	9	68.2	7	46.12	34	55.1	7
28.3	40.28	19	59.9	2	13.35	9	9.2	6	27.24	9	68.8	6	45.77	35	55.3	2
July 8.2	40.08	20	59.6	3	13.26	9	8.7	5	27.14	10	69.3	5	45.42	35	55.0	3
18.2	39.88	20	58.9	7	13.16	10	8.2	5	27.04	10	69.7	4	45.08	34	54.2	8
28.2	39.68	20	57.9	10	13.07	9	7.7	5	26.95	9	69.9	2	44.76	32	52.9	13
Aug. 7.1	39.49	19	56.5	14	12.98	9	7.3	4	26.86	9	70.0	1	44.46	30	51.1	18
17.1	39.33	16	54.8	17	12.91	7	7.0	3	26.79	7	69.8	2	44.20	26	48.9	22
27.1	39.20	13	52.9	19	12.85	6	6.8	2	26.73	6	69.4	4	43.99	21	46.3	26
Sept. 6.1	39.10	10	50.8	21	12.81	4	6.7	1	26.69	4	68.9	5	43.83	16	43.4	29
16.0	39.05	5	48.6	22	12.80	1	6.8	1	26.68	1	68.1	8	43.73	10	40.2	32
26.0	39.06	1	46.5	21	12.83	3	7.1	3	26.70	2	67.0	11	43.69	4	36.7	35
Oct. 6.0	39.12	6	44.5	20	12.89	6	7.7	6	26.76	6	65.7	13	43.72	3	33.0	37
16.0	39.25	13	42.6	19	12.99	10	8.5	8	26.86	10	64.2	15	43.83	11	29.3	37
25.9	39.45	20	41.0	16	13.13	14	9.6	11	27.00	14	62.5	17	44.03	20	25.5	38
Nov. 4.9	39.71	26	39.8	12	13.32	19	11.0	14	27.19	19	60.5	20	44.31	28	21.8	37
14.9	40.03	32	39.1	7	13.55	23	12.6	16	27.42	23	58.4	21	44.67	36	18.3	35
24.8	40.40	37	38.8	3	13.82	27	14.4	18	27.69	27	56.1	23	45.10	43	15.0	33
Dec. 4.8	40.82	42	39.0	2	14.12	30	16.4	20	27.99	30	53.7	24	45.59	49	12.0	30
14.8	41.26	44	39.7	7	14.44	32	18.6	22	28.32	33	51.3	24	46.14	55	9.5	25
24.8	41.72	46	41.0	13	14.78	34	20.8	22	28.66	34	49.0	23	46.73	59	7.5	20
34.7	42.18	46	42.8	18	15.12	34	23.0	22	29.01	35	46.8	22	47.34	61	6.1	14
Sec δ, Tan δ	1.508		−1.129		1.000		−0.017		1.018		+0.189		2.217		+1.979	
Mean Place	$39^{s}.480$		$36''.04$		$12^{s}.091$		$0''.74$		$25^{s}.862$		$73''.30$		$43^{s}.494$		$45''.84$	
$D'_\psi a$, $D_\omega a$	0.00		−0.07		0.00		0.00		0.00		+0.01		−0.01		+0.13	
$D_\psi \delta$, $D_\omega \delta$	−0.4		−0.2		−0.4		−0.2		−0.4		−0.2		−0.4		−0.2	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	**β Crucis.** Mag. 1.5				**31 Comæ.** Mag. 5.1				**32 H. Camelop.** *seq.* Mag. 5.3				***n* Centauri.** Mag. 4.3			
	Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination S.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	12 42		−59 12		12 47		+28 0		12 48		+83 52		12 48		−39 41	
	s		″		s		″		s		″		s		″	
Jan. 0.8	32.81		10.2		24.55		60.2		32.09		69.2		32.51		48.4	
10.7	33.37	56	12.0	18	24.92	37	58.3	19	34.28	219	68.5	7	32.92	41	50.4	20
20.7	33.90	53	14.2	22	25.27	35	56.8	15	36.45	217	68.5	0	33.31	39	52.7	23
30.7	34.39	49	16.8	26	25.61	34	55.8	10	38.53	208	69.1	6	33.68	37	55.2	25
Feb. 9.6	34.83	44	19.8	30	25.92	31	55.2	6	40.45	192	70.3	12	34.01	33	57.9	27
		38		32		27		1		168		18		29		28
19.6	35.21		23.0		26.19		55.1		42.13		72.1		34.30		60.7	
29.6	35.53	32	26.3	33	26.42	23	55.4	3	43.52	139	74.4	23	34.55	25	63.6	29
Mar. 10.6	35.78	25	29.7	34	26.61	19	56.1	7	44.56	104	77.1	27	34.75	20	66.4	28
20.5	35.97	19	33.2	35	26.75	14	57.2	11	45.24	68	80.0	29	34.90	15	69.1	27
30.5	36.09	12	36.6	34	26.85	10	58.5	13	45.53	29	83.1	31	35.01	11	71.6	25
		6		32		5		15		9		31		7		24
Apr. 9.5	36.15		39.8		26.90		60.0		45.44		86.2		35.08		74.0	
19.5	36.15	0	42.8	30	26.92	2	61.6	16	44.97	47	89.1	29	35.11	3	76.2	22
29.4	36.10	5	45.6	28	26.90	2	63.3	17	44.17	80	91.9	28	35.11	0	78.1	19
May 9.4	36.00	10	48.1	25	26.86	4	64.9	16	43.07	110	94.3	24	35.08	3	79.7	16
19.4	35.85	15	50.3	22	26.80	6	66.5	16	41.70	137	96.3	20	35.02	6	81.1	14
		19		18		9		14		157		15		9		11
29.3	35.66		52.1		26.71		67.9		40.13		97.8		34.93		82.2	
June 8.3	35.44	22	53.5	14	26.61	10	69.1	12	38.40	173	98.8	10	34.82	11	82.9	7
18.3	35.19	25	54.4	9	26.50	11	70.0	9	36.56	184	99.3	5	34.69	13	83.3	4
28.3	34.92	27	54.8	4	26.38	12	70.7	7	34.68	188	99.2	1	34.55	14	83.3	0
July 8.2	34.63	29	54.8	0	26.26	12	71.1	4	32.80	188	98.6	6	34.40	15	83.0	3
		29		5		13		1		184		12		16		6
18.2	34.34		54.3		26.13		71.2		30.96		97.4		34.24		82.4	
28.2	34.05	29	53.4	9	26.01	12	71.0	2	29.21	175	95.7	17	34.08	16	81.5	9
Aug. 7.2	33.78	27	52.0	14	25.90	11	70.5	5	27.60	161	93.5	22	33.93	15	80.3	12
17.1	33.54	24	50.3	17	25.80	10	69.6	9	26.15	145	90.9	26	33.80	13	78.9	14
27.1	33.34	20	48.3	20	25.72	8	68.4	12	24.90	125	87.9	30	33.69	11	77.3	16
		16		23		6		14		102		33		8		17
Sept. 6.1	33.18		46.0		25.66		67.0		23.88		84.6		33.61		75.6	
16.0	33.08	10	43.6	24	25.63	3	65.3	17	23.11	77	81.0	36	33.56	5	73.8	18
26.0	33.05	3	41.1	25	25.63	0	63.3	20	22.63	48	77.2	38	33.55	1	72.0	18
Oct. 6.0	33.11	6	38.6	25	25.67	4	61.1	22	22.44	19	73.3	39	33.60	5	70.3	17
16.0	33.25	14	36.2	24	25.76	9	58.7	24	22.57	13	69.3	40	33.71	11	68.8	15
		22		21		14		26		45		39		17		11
25.9	33.47		34.1		25.90		56.1		23.02		65.4		33.88		67.7	
Nov. 4.9	33.77	30	32.4	17	26.08	18	53.3	28	23.78	76	61.6	38	34.10	22	66.9	8
14.9	34.15	38	31.1	13	26.31	23	50.4	29	24.86	108	58.1	35	34.37	27	66.5	4
24.9	34.60	45	30.3	8	26.58	27	47.5	29	26.24	138	54.9	32	34.69	32	66.5	0
Dec. 4.8	35.11	51	30.1	2	26.89	31	44.7	28	27.88	164	52.1	28	35.06	37	66.9	4
		55		4		34		27		187		23		40		9
14.8	35.66		30.5		27.23		42.0		29.75		49.8		35.46		67.8	
24.8	36.22	56	31.4	9	27.59	36	39.6	24	31.78	203	48.1	17	35.87	41	69.2	14
34.7	36.78	56	32.8	14	27.96	37	37.5	21	33.92	214	47.0	11	36.28	41	71.0	18
Sec δ, Tan δ	1.954		−1.678		1.133		+0.532		9.392		+9.339		1.300		−0.830	
Mean Place	$34^{s}.236$		$28''.48$		$24^{s}.787$		$69''.72$		$28^{s}.229$		$88''.38$		$33^{s}.498$		$61''.62$	
$D'_{\psi}\alpha$, $D_{\omega}\alpha$	+0.01		−0.11		0.00		+0.03		−0.05		+0.61		0.00		−0.05	
$D_{\psi}\delta$, $D_{\omega}\delta$	−0.4		−0.2		−0.4		−0.2		−0.4		−0.2		−0.4		−0.2	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	ε Ursæ Majoris. Mag. 1.7				δ Virginis. Mag. 3.7				α Can. Ven. *seq.* Mag. 2.9				δ Muscæ. Mag. 3.6			
	Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination S.	
	h m 12 50		° ′ +56 25		h m 12 51		° ′ + 3 52		h m 12 51		° ′ +38 47		h m 12 56		° ′ −71 4	
	s		″		s		″		s		″		s		″	
Jan. 0.8	9.90		57.8		9.70		30.2		54.67		23.7		9.50		8.1	
10.7	10.42	52	56.4	14	10.04	34	28.1	21	55.07	40	21.9	18	10.32	82	9.4	13
20.7	10.93	51	55.6	8	10.37	33	26.1	20	55.46	39	20.7	12	11.11	79	11.3	19
30.7	11.42	49	55.4	2	10.68	31	24.3	18	55.83	37	20.0	7	11.85	74	13.7	24
Feb. 9.6	11.86	44	55.9	5	10.96	28	22.8	15	56.17	34	19.8	2	12.52	67	16.5	28
19.6	12.25	39	57.0	11	11.21	25	21.6	12	56.47	30	20.1	3	13.11	59	19.6	31
29.6	12.58	33	58.6	16	11.43	22	20.7	9	56.73	26	20.9	8	13.61	50	23.0	34
Mar. 10.6	12.84	26	60.6	20	11.61	18	20.1	6	56.94	21	22.1	12	14.02	41	26.5	35
20.5	13.03	19	62.9	23	11.74	13	19.7	4	57.09	15	23.7	16	14.32	30	30.1	36
30.5	13.14	11	65.4	25	11.83	9	19.6	1	57.19	10	25.6	19	14.52	20	33.8	37
Apr. 9.5	13.19	5	68.0	26	11.89	6	19.8	2	57.25	6	27.6	20	14.63	11	37.4	36
19.5	13.17	2	70.7	27	11.93	4	20.1	3	57.26	1	29.7	21	14.64	1	40.9	35
29.4	13.09	8	73.3	26	11.94	1	20.6	5	57.23	3	31.8	21	14.56	8	44.2	33
May 9.4	12.96	13	75.7	24	11.92	2	21.2	6	57.17	6	33.8	20	14.39	17	47.2	30
19.4	12.78	18	77.8	21	11.88	4	21.9	7	57.08	9	35.7	19	14.15	24	49.8	26
29.3	12.57	21	79.5	17	11.83	5	22.6	7	56.97	11	37.3	16	13.83	32	52.1	23
June 8.3	12.33	24	80.9	14	11.76	7	23.3	7	56.84	13	38.6	13	13.45	38	54.0	19
18.3	12.08	25	81.8	9	11.68	8	24.0	7	56.69	15	39.6	10	13.01	44	55.4	14
28.3	11.82	26	82.3	5	11.59	9	24.6	6	56.54	15	40.3	7	12.53	48	56.3	9
July 8.2	11.55	27	82.3	0	11.49	10	25.1	5	56.39	15	40.6	3	12.03	50	56.7	4
18.2	11.28	27	81.8	5	11.39	10	25.6	5	56.23	16	40.5	1	11.51	52	56.6	1
28.2	11.03	25	80.8	10	11.29	10	26.0	4	56.08	15	40.0	5	10.99	52	56.0	6
Aug. 7.2	10.79	24	79.3	15	11.20	9	26.3	3	55.94	14	39.2	8	10.49	50	54.8	12
17.1	10.58	21	77.4	19	11.12	8	26.4	1	55.81	13	38.0	12	10.03	46	53.2	16
27.1	10.40	18	75.1	23	11.05	7	26.4	0	55.70	11	36.4	16	9.64	39	51.2	20
Sept. 6.1	10.26	14	72.5	26	11.00	5	26.2	2	55.62	8	34.5	19	9.32	32	48.8	24
16.0	10.16	10	69.6	29	10.98	2	25.8	4	55.57	5	32.3	22	9.10	22	46.2	26
26.0	10.12	4	66.4	32	10.99	1	25.2	6	55.56	1	29.8	25	8.99	11	43.5	27
Oct. 6.0	10.14	2	62.9	35	11.03	4	24.3	9	55.59	3	27.0	28	9.01	2	40.7	28
16.0	10.23	9	59.3	36	11.12	9	23.2	11	55.67	8	24.0	30	9.15	14	38.0	27
25.9	10.38	15	55.6	37	11.25	13	21.8	14	55.80	13	20.9	31	9.43	28	35.5	25
Nov. 4.9	10.60	22	52.0	36	11.42	17	20.2	16	55.98	18	17.7	32	9.84	41	33.3	22
14.9	10.89	29	48.5	35	11.64	22	18.4	18	56.22	24	14.5	32	10.37	53	31.4	19
24.9	11.24	35	45.1	34	11.89	25	16.4	20	56.51	29	11.4	31	11.00	63	30.0	14
Dec. 4.8	11.65	41	42.0	31	12.18	29	14.3	21	56.84	33	8.4	30	11.72	72	29.2	8
14.8	12.11	46	39.3	27	12.50	32	12.0	23	57.20	36	5.6	28	12.50	78	28.9	3
24.8	12.61	50	37.0	23	12.84	34	9.7	23	57.58	38	3.2	24	13.31	81	29.3	4
34.7	13.12	51	35.3	17	13.18	34	7.5	22	57.98	40	1.2	20	14.14	83	30.3	10
Sec δ, Tan δ	1.809		+1.507		1.002		+0.068		1.283		+0.804		3.083		−2.917	
Mean Place	$9^{s}.694$		74″.35		$10^{s}.204$		31″.82		$54^{s}.803$		36″.40		$11^{s}.897$		27″.80	
$D'_{\psi}\alpha$, $D_{\omega}\alpha$	−0.01		+0.10		0.00		0.00		0.00		+0.05		+0.02		−0.19	
$D_{\psi}\delta$, $D_{\omega}\delta$	−0.4		−0.2		−0.4		−0.2		−0.4		−0.2		−0.4		−0.2	

Mean Solar Date.	**ε Virginis.** Mag. 3.0				**θ Virginis.** Mag. 4.4				**48 Comæ.** Mag. 4.3				**20 Canum Venat.** Mag. 4.7			
	Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination N.	
	h m 12 57		° ′ +11 25		h m 13 5		° ′ − 5 4		h m 13 7		° ′ +28 18		h m 13 13		° ′ +41 1	
	s		″		s		″		s		″		s		″	
n. 0.8	47.31		50.5		22.85		8.8		45.74		76.3		35.70		54.7	
10.7	47.65	34	48.4	21	23.19	34	11.0	22	46.10	36	74.3	20	36.11	41	52.8	19
20.7	47.99	34	46.5	19	23.52	33	13.1	21	46.46	36	72.7	16	36.51	40	51.4	14
30.7	48.31	32	44.9	16	23.84	32	15.1	20	46.81	35	71.5	12	36.90	39	50.5	9
b. 9.7	48.60	29	43.6	13	24.13	29	16.9	18	47.13	32	70.8	7	37.26	36	50.2	3
19.6	48.86	26	42.7	9	24.39	26	18.5	16	47.41	28	70.6	2	37.58	32	50.5	3
29.6	49.08	22	42.2	5	24.61	22	19.9	14	47.66	25	70.9	3	37.86	28	51.2	7
ar. 10.6	49.26	18	42.0	2	24.80	19	21.0	11	47.86	20	71.6	7	38.10	24	52.4	12
20.6	49.40	14	42.1	1	24.95	15	21.8	8	48.02	16	72.6	10	38.28	18	54.0	16
30.5	49.51	11	42.5	4	25.07	12	22.4	6	48.14	12	74.0	14	38.41	13	56.0	20
pr. 9.5	49.58	7	43.1	6	25.15	8	22.8	4	48.21	7	75.6	16	38.49	8	58.2	22
19.5	49.61	3	43.9	8	25.20	5	23.0	2	48.25	4	77.3	17	38.53	4	60.5	23
29.4	49.62	1	44.8	9	25.22	2	23.0	0	48.26	1	79.0	17	38.53	0	62.7	22
ay 9.4	49.61	1	45.8	10	25.22	0	22.8	2	48.23	3	80.8	18	38.49	4	64.9	22
19.4	49.57	4	46.8	10	25.20	2	22.5	3	48.17	6	82.5	17	38.41	8	66.9	20
29.4	49.51	6	47.8	10	25.15	5	22.1	4	48.09	8	84.0	15	38.30	11	68.7	18
ne 8.3	49.44	7	48.7	9	25.09	6	21.7	4	48.00	9	85.3	13	38.17	13	70.3	16
18.3	49.36	8	49.5	8	25.02	7	21.2	5	47.90	10	86.4	11	38.02	15	71.5	12
28.3	49.27	9	50.2	7	24.94	8	20.7	5	47.78	12	87.3	9	37.86	16	72.3	8
ly 8.3	49.17	10	50.7	5	24.85	9	20.1	6	47.65	13	87.9	6	37.69	17	72.8	5
18.2	49.06	11	51.1	4	24.75	10	19.5	6	47.52	13	88.2	3	37.52	17	72.9	1
28.2	48.96	10	51.3	2	24.65	10	19.0	5	47.39	13	88.1	1	37.35	17	72.5	4
ug. 7.2	48.86	10	51.4	1	24.55	10	18.5	5	47.26	13	87.7	4	37.18	17	71.7	8
17.1	48.77	9	51.3	1	24.46	9	18.1	4	47.14	12	87.0	7	37.02	16	70.6	11
27.1	48.70	7	51.0	3	24.38	8	17.7	4	47.04	10	86.0	10	36.89	13	69.1	15
pt. 6.1	48.64	6	50.4	6	24.32	6	17.5	2	46.96	8	84.6	14	36.78	11	67.2	19
16.1	48.61	3	49.6	8	24.28	4	17.4	1	46.90	6	82.9	17	36.70	8	65.0	22
26.0	48.61	0	48.5	11	24.28	9	17.5	1	46.88	2	81.0	19	36.66	4	62.4	26
ct. 6.0	48.64	3	47.2	13	24.31	3	17.8	3	46.90	2	78.8	22	36.66	0	59.6	28
16.0	48.72	8	45.7	15	24.38	7	18.4	6	46.96	6	76.4	24	36.70	4	56.6	30
25.9	48.84	12	43.9	18	24.50	12	19.2	8	47.07	11	73.8	26	36.80	10	53.4	32
ov. 4.9	49.01	17	41.9	20	24.67	17	20.3	11	47.23	16	71.0	28	36.96	16	50.1	33
14.9	49.22	21	39.7	22	24.88	21	21.6	13	47.43	20	68.1	29	37.18	22	46.7	34
24.9	49.47	25	37.4	23	25.13	25	23.2	16	47.68	25	65.2	29	37.45	27	43.4	33
c. 4.8	49.76	29	35.0	24	25.42	29	25.0	18	47.97	29	62.3	29	37.76	31	40.3	31
14.8	50.08	32	32.6	24	25.74	32	27.0	20	48.30	33	59.6	27	38.11	35	37.4	29
24.8	50.42	34	30.2	24	26.07	33	29.1	21	48.65	35	57.1	25	38.49	38	34.8	26
34.8	50.76	34	27.9	23	26.41	34	31.3	22	49.02	37	54.8	23	38.89	40	32.6	22
δ, Tan δ	1.020		+0.202		1.004		−0.089		1.136		+0.539		1.326		+0.870	
n Place	47ˢ.781		54″.93		23ˢ.519		9″.90		46ˢ.106		86″.52		35ˢ.969		68″.62	
α, D_{ω} α	0.00		+0.01		0.00		−0.01		0.00		+0.03		−0.01		+0.06	
δ, D_{ω} δ	−0.4		−0.2		−0.4		−0.3		−0.4		−0.3		−0.4		−0.3	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	γ Hydræ. Mag. 3.3				ι Centauri. Mag. 2.9				ζ¹ Ursæ Majoris. Mag. 2.4				α Virginis. Mag. 1.2			
	Right Ascension.		Declination S.		Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination S.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	13 14		−22 42		13 15		−36 14		13 20		+55 22		13 20		−10 42	
	s		″		s		″		s		″		s		″	
Jan. 0.8	7.14	37	20.1	20	37.52	40	43.0	18	23.02	49	47.8	18	32.49	34	5.5	21
10.8	7.51	35	22.1	22	37.92	39	44.8	21	23.51	49	46.0	12	32.83	34	7.6	21
20.7	7.86	34	24.3	22	38.31	37	46.9	23	24.00	48	44.8	5	33.17	33	9.7	21
30.7	8.20	31	26.5	22	38.68	34	49.2	25	24.48	46	44.3	1	33.50	30	11.8	19
Feb. 9.7	8.51	28	28.7	22	39.02	31	51.7	25	24.94	42	44.4	7	33.80	27	13.7	18
19.6	8.79	24	30.9	21	39.33	27	54.2	26	25.36	36	45.1	13	34.07	24	15.5	16
29.6	9.03	21	33.0	20	39.60	23	56.8	25	25.72	29	46.4	17	34.31	20	17.1	14
Mar. 10.6	9.24	17	35.0	18	39.83	18	59.3	25	26.01	23	48.1	22	34.51	17	18.5	11
20.6	9.41	13	36.8	16	40.01	14	61.8	23	26.24	16	50.3	25	34.68	13	19.6	9
30.5	9.54	10	38.4	14	40.15	11	64.1	22	26.40	10	52.8	26	34.81	10	20.5	7
Apr. 9.5	9.64	6	39.8	12	40.26	7	66.3	20	26.50	3	55.4	27	34.91	7	21.2	5
19.5	9.70	3	41.0	10	40.33	3	68.3	18	26.53	3	58.1	27	34.98	4	21.7	3
29.4	9.73	1	42.0	8	40.36	0	70.1	15	26.50	9	60.8	26	35.02	1	22.0	1
May 9.4	9.74	2	42.8	6	40.36	3	71.6	13	26.41	14	63.4	24	35.03	1	22.1	0
19.4	9.72	4	43.4	5	40.33	5	72.9	11	26.27	17	65.8	20	35.02	3	22.1	1
29.4	9.68	6	43.9	2	40.28	8	74.0	8	26.10	21	67.8	17	34.99	5	22.0	3
June 8.3	9.62	8	44.1	0	40.20	10	74.8	4	25.89	23	69.5	13	34.94	7	21.7	3
18.3	9.54	9	44.1	2	40.10	12	75.2	1	25.66	25	70.8	8	34.87	8	21.4	4
28.3	9.45	11	43.9	4	39.98	14	75.3	1	25.41	26	71.6	3	34.79	9	21.0	5
July 8.3	9.34	11	43.5	5	39.84	15	75.2	4	25.15	27	71.9	1	34.70	10	20.5	5
18.2	9.23	12	43.0	6	39.69	15	74.8	7	24.88	27	71.8	6	34.60	11	20.0	6
28.2	9.11	12	42.4	8	39.54	14	74.1	9	24.61	26	71.2	11	34.49	11	19.4	6
Aug. 7.2	8.99	11	41.6	9	39.40	14	73.2	12	24.35	24	70.1	16	34.38	10	18.8	6
17.1	8.88	10	40.7	10	39.26	13	72.0	13	24.11	21	68.5	20	34.28	9	18.2	5
27.1	8.78	7	39.7	10	39.13	10	70.7	15	23.90	18	66.5	24	34.19	8	17.7	5
Sept. 6.1	8.71	5	38.7	10	39.03	7	69.2	16	23.72	15	64.1	27	34.11	5	17.2	4
16.1	8.66	2	37.7	9	38.96	3	67.6	15	23.57	10	61.4	31	34.06	2	16.8	2
26.0	8.64	2	36.8	7	38.93	2	66.1	14	23.47	4	58.3	33	34.04	2	16.6	0
Oct. 6.0	8.66	7	36.1	5	38.95	7	64.7	13	23.43	3	55.0	35	34.06	6	16.6	2
16.0	8.73	12	35.6	3	39.02	13	63.4	11	23.46	9	51.5	37	34.12	11	16.8	4
26.0	8.85	17	35.3	0	39.15	18	62.3	8	23.55	16	47.8	37	34.23	15	17.2	7
Nov. 4.9	9.02	22	35.3	3	39.33	24	61.5	4	23.71	23	44.1	37	34.38	20	17.9	10
14.9	9.24	27	35.6	7	39.57	29	61.1	0	23.94	30	40.4	35	34.58	25	18.9	13
24.9	9.51	30	36.3	11	39.86	34	61.1	4	24.24	36	36.9	33	34.83	28	20.2	15
Dec. 4.8	9.81	33	37.4	14	40.20	37	61.5	8	24.60	42	33.6	30	35.11	31	21.7	18
14.8	10.14	36	38.8	16	40.57	39	62.3	12	25.02	46	30.6	26	35.42	34	23.5	19
24.8	10.50	36	40.4	18	40.96	40	63.5	16	25.48	48	28.0	21	35.76	34	25.4	20
34.8	10.86		42.2		41.36		65.1		25.96		25.9		36.10		27.4	
Sec δ, Tan δ	1.084		−0.418		1.240		−0.733		1.760		+1.449		1.018		−0.189	
Mean Place	8ˢ.061		26″.93		38ˢ.658		54″.12		23ˢ.138		64″.94		33ˢ.305		7″.95	
D′ψ a, Dω a	0.00		−0.03		+0.01		−0.05		−0.01		+0.09		0.00		−0.01	
Dψ δ, Dω δ	−0.4		−0.3		−0.4		−0.3		−0.4		−0.3		−0.4		−0.3	

FOR THE UPPER TRANSIT AT WASHINGTON.

an Solar Date.	**Groombridge 2001.** Mag. 6.1		**70 Virginis.** Mag. 5.2		**κ Octantis.** Mag. 5.6		**ζ Virginis.** Mag. 3.4	
	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension.	Declination S.
	h m 13 23	° ′ +72 50	h m 13 24	° ′ +14 14	h m 13 26	° ′ −85 19	h m 13 30	° ′ − 0 8
	s	″	s	″	s	″	s	″
n. 0.8	53.65	34.0	6.96	48.4	18.47	49.4	11.69	48.0
10.8	54.49 84	32.6 14	7.30 34	46.2 22	21.45 298	49.9 5	12.03 34	50.1 21
20.7	55.34 85	31.8 8	7.64 34	44.2 20	24.39 294	51.1 12	12.37 34	52.2 21
30.7	56.18 84	31.7 1	7.97 33	42.6 16	27.22 283	52.8 17	12.69 32	54.1 19
b. 9.7	56.97 79	32.2 5	8.28 31	41.4 12	29.87 265	55.1 23	12.99 30	55.7 16
19.6	57.69 72	33.4 12	8.56 28	40.5 9	32.28 241	57.8 27	13.26 27	57.1 14
29.6	58.31 62	35.1 17	8.80 24	40.0 5	34.39 211	60.9 31	13.50 24	58.2 11
ır.10.6	58.82 51	37.3 22	9.00 20	39.9 1	36.16 177	64.3 34	13.71 21	59.0 8
20.6	59.21 39	39.9 26	9.17 17	40.1 2	37.58 142	67.9 36	13.89 18	59.6 6
30.5	59.47 26	42.8 29	9.30 13	40.6 5	38.62 104	71.6 37	14.03 14	59.9 3
r. 9.5	59.59 12	45.8 30	9.40 10	41.4 8	39.26 64	75.4 38	14.13 10	60.0 1
19.5	59.57 2	48.9 31	9.46 6	42.4 10	39.50 24	79.2 38	14.20 7	59.8 2
29.5	59.43 14	51.8 29	9.49 3	43.5 11	39.34 16	82.9 37	14.25 5	59.5 3
ıy 9.4	59.18 25	54.5 27	9.50 1	44.7 12	38.79 55	86.4 35	14.27 2	59.0 5
19.4	58.83 35	56.9 24	9.48 2	45.9 12	37.87 92	89.7 33	14.26 1	58.5 5
29.4	58.39 44	59.0 21	9.43 5	47.0 11	36.60 127	92.6 29	14.23 3	57.9 6
ne 8.3	57.88 51	60.6 16	9.37 6	48.1 11	35.01 159	95.2 26	14.19 4	57.2 7
18.3	57.32 56	61.8 12	9.30 7	49.0 9	33.14 187	97.3 21	14.13 6	56.6 6
28.3	56.72 60	62.4 6	9.21 9	49.8 8	31.04 210	99.0 17	14.05 8	56.0 6
ly 8.3	56.10 62	62.5 1	9.11 10	50.5 7	28.77 227	100.1 11	13.96 9	55.4 6
18.2	55.47 63	62.1 4	9.00 11	51.0 5	26.39 238	100.6 5	13.86 10	54.9 5
28.2	54.85 62	61.1 10	8.88 12	51.2 2	23.99 240	100.6 0	13.75 11	54.4 5
ıg. 7.2	54.26 59	59.6 15	8.77 11	51.2 0	21.64 235	100.0 6	13.64 11	54.0 4
17.2	53.70 56	57.6 20	8.66 11	51.0 2	19.41 223	98.9 11	13.54 10	53.7 3
27.1	53.20 50	55.1 25	8.57 9	50.6 4	17.39 202	97.2 17	13.44 10	53.5 2
pt. 6.1	52.76 44	52.3 28	8.49 8	49.9 7	15.66 173	95.1 21	13.36 8	53.5 0
16.1	52.41 35	49.1 32	8.43 6	49.0 9	14.29 137	92.6 25	13.31 5	53.7 2
26.0	52.15 26	45.6 35	8.40 3	47.8 12	13.35 94	89.8 28	13.28 3	54.1 4
t. 6.0	51.99 16	41.9 37	8.41 1	46.4 14	12.87 48	86.9 29	13.29 1	54.7 6
16.0	51.95 4	38.1 38	8.46 5	44.7 17	12.91 4	83.9 30	13.34 5	55.5 8
26.0	52.03 8	34.1 40	8.55 9	42.8 19	13.46 55	80.9 30	13.43 9	56.5 10
v. 4.9	52.23 20	30.2 39	8.69 14	40.6 22	14.53 107	78.1 28	13.57 14	57.8 13
14.9	52.56 33	26.4 38	8.88 19	38.3 23	16.08 155	75.6 25	13.75 18	59.4 16
24.9	53.02 46	22.8 36	9.11 23	35.8 25	18.07 199	73.5 21	13.98 23	61.2 18
c. 4.9	53.59 57	19.5 33	9.38 27	33.2 26	20.43 236	71.9 16	14.25 27	63.2 20
14.8	54.26 67	16.6 29	9.68 30	30.7 25	23.08 265	70.8 11	14.55 30	65.3 21
24.8	55.01 75	14.2 24	10.01 33	28.2 25	25.94 286	70.3 5	14.87 32	67.4 21
34.8	55.82 81	12.4 18	10.35 34	25.9 23	28.91 297	70.5 2	15.21 34	69.6 22
δ, Tan δ	3.391	+3.240	1.032	+0.254	12.303	−12.262	1.000	−0.003
n Place	53^s.294	53″.57	7^s.557	54″.68	29^s.25	68″.98	12^s.462	46″.42
a, D$_\omega$ a	−0.03	+0.20	0.00	+0.02	+0.12	−0.76	0.00	0.00
δ, D$_\omega$ δ	−0.4	−0.4	−0.4	−0.4	−0.4	−0.4	−0.4	−0.4

[Eph 12]

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	17 H. Canum Venat. Mag. 5.0 Right Ascension.		17 H. Canum Venat. Declination N.		ε Centauri. Mag. 2.6 Right Ascension.		ε Centauri. Declination S.		m Virginis. Mag. 5.2 Right Ascension.		m Virginis. Declination S.		τ Boötis. Mag. 4.5 Right Ascension.		τ Boötis. Declination N.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	13 30		+37 37		13 34		−53 0		13 36		− 8 15		13 43		+17 53	
	s		″		s		″		s		″		s		″	
Jan. 0.8	51.73		45.5		16.49		55.3		58.59		32.4		4.13		33.9	
10.8	52.12	39	43.4	21	16.99	50	56.6	13	58.93	34	34.5	21	4.48	35	31.6	23
20.7	52.51	39	41.8	16	17.49	50	58.3	17	59.27	34	36.5	20	4.82	34	29.7	19
30.7	52.89	38	40.7	11	17.97	48	60.3	20	59.59	32	38.5	20	5.15	33	28.1	16
Feb. 9.7	53.25	36	40.2	5	18.42	45	62.7	24	59.90	31	40.3	18	5.47	32	26.9	12
19.7	53.57	32	40.2	0	18.82	40	65.4	27	60.18	28	42.0	17	5.76	29	26.1	8
29.6	53.85	28	40.7	5	19.18	36	68.2	28	60.43	25	43.5	15	6.02	26	25.7	4
Mar. 10.6	54.09	24	41.7	10	19.49	31	71.1	29	60.65	22	44.7	12	6.24	22	25.7	0
20.6	54.29	20	43.1	14	19.75	26	74.1	30	60.83	18	45.7	10	6.43	19	26.2	5
30.5	54.44	15	44.8	17	19.96	21	77.1	30	60.98	15	46.4	7	6.58	15	27.0	8
Apr. 9.5	54.54	10	46.8	20	20.12	16	80.0	29	61.10	12	46.9	5	6.69	11	28.0	10
19.5	54.60	6	48.9	21	20.22	10	82.8	28	61.18	8	47.2	3	6.77	8	29.2	12
29.5	54.62	2	51.1	22	20.28	6	85.5	27	61.23	5	47.4	2	6.82	5	30.5	13
May 9.4	54.60	2	53.3	22	20.29	1	87.9	24	61.26	3	47.4	0	6.84	2	31.9	14
19.4	54.55	5	55.4	21	20.26	3	90.0	21	61.26	0	47.2	2	6.83	1	33.3	14
29.4	54.47	8	57.3	19	20.18	8	91.9	19	61.24	2	46.9	3	6.80	3	34.7	14
June 8.4	54.37	10	58.9	16	20.06	12	93.5	16	61.20	4	46.6	3	6.74	6	36.0	13
18.3	54.24	13	60.3	14	19.91	15	94.7	12	61.14	6	46.2	4	6.67	7	37.1	11
28.3	54.10	14	61.3	10	19.73	18	95.5	8	61.07	7	45.8	4	6.58	9	38.1	10
July 8.3	53.94	16	61.9	6	19.53	20	95.9	4	60.98	9	45.3	5	6.47	11	38.8	7
18.2	53.78	16	62.1	2	19.30	23	95.8	1	60.88	10	44.7	6	6.36	11	39.3	5
28.2	53.62	16	62.0	1	19.06	24	95.3	5	60.77	11	44.2	5	6.24	12	39.6	3
Aug. 7.2	53.46	16	61.5	5	18.83	23	94.5	8	60.66	11	43.7	5	6.11	13	39.7	1
17.2	53.30	16	60.6	9	18.60	23	93.4	11	60.55	11	43.2	5	5.99	12	39.5	2
27.1	53.15	15	59.3	13	18.39	21	91.9	15	60.45	10	42.8	4	5.88	11	39.0	5
Sept. 6.1	53.03	12	57.7	16	18.21	18	90.1	18	60.37	8	42.4	4	5.78	10	38.2	8
16.1	52.94	9	55.7	20	18.07	14	88.1	20	60.31	6	42.2	2	5.70	8	37.2	10
26.1	52.88	6	53.4	23	17.99	8	86.0	21	60.27	4	42.1	1	5.65	5	35.9	13
Oct. 6.0	52.86	2	50.8	26	17.97	2	83.8	22	60.27	0	42.2	1	5.63	2	34.3	16
16.0	52.89	3	47.9	29	18.02	5	81.7	21	60.32	5	42.5	3	5.66	3	32.4	19
26.0	52.97	8	44.9	30	18.14	12	79.8	19	60.41	9	43.1	6	5.73	7	30.3	21
Nov. 4.9	53.10	13	41.7	32	18.34	20	78.1	17	60.55	14	43.9	8	5.85	12	28.0	23
14.9	53.29	19	38.4	33	18.62	28	76.7	14	60.73	18	45.0	11	6.02	17	25.5	25
24.9	53.53	24	35.1	33	18.96	34	75.7	10	60.96	23	46.4	14	6.23	21	22.9	26
Dec. 4.9	53.82	29	31.9	32	19.36	40	75.1	6	61.23	27	48.0	16	6.49	26	20.3	26
14.8	54.15	33	28.9	30	19.81	45	75.1	0	61.53	30	49.8	18	6.78	29	17.6	27
24.8	54.51	36	26.2	27	20.29	48	75.6	5	61.85	32	51.7	19	7.10	32	15.0	26
34.8	54.89	38	23.9	23	20.79	50	76.5	9	62.19	34	53.7	20	7.44	34	12.6	24
Sec δ, Tan δ	1.263		+0.771		1.662		−1.328		1.010		−0.145		1.050		+0.323	
Mean Place	52ˢ.163		59″.00		18ˢ.229		69″.88		59ˢ.475		33″.36		4ˢ.817		41″.90	
D′ψ α, Dω α	−0.01		+0.05		+0.01		−0.08		0.00		−0.01		0.00		+0.02	
Dψ δ, Dω δ	−0.4		−0.4		−0.4		−0.4		−0.4		−0.4		−0.4		−0.4	

FOR THE UPPER TRANSIT AT WASHINGTON.

ean Solar Date.	**η Ursæ Majoris.** Mag. 1.9				**89 Virginis.** Mag. 5.1				**ζ Centauri.** Mag. 3.1				**η Boötis.** Mag. 2.8			
	Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination S.		Right Ascension.		Declination N.	
	h m 13 44		° ′ +49 44		h m 13 45		° ′ −17 41		h m 13 50		° ′ −46 51		h m 13 50		° ′ +18 49	
	s		″		s		″		s		″		s		″	
n. 0.8	4.08		51.2		4.17		42.2		0.94		8.0		28.96		70.1	
10.8	4.52	44	49.1	21	4.53	36	44.1	19	1.40	46	9.2	12	29.30	34	67.8	23
20.7	4.97	45	47.6	15	4.88	35	46.1	20	1.85	45	10.8	16	29.65	35	65.8	20
30.7	5.41	44	46.6	10	5.22	34	48.2	21	2.29	44	12.7	19	29.99	34	64.1	17
b. 9.7	5.83	42	46.3	3	5.54	32	50.2	20	2.71	42	14.9	22	30.31	32	62.9	12
19.7	6.22	39	46.6	3	5.83	29	52.1	19	3.09	38	17.4	25	30.60	29	62.1	8
29.6	6.56	34	47.5	9	6.09	26	53.9	18	3.43	34	20.0	26	30.87	27	61.7	4
ır.10.6	6.85	29	48.9	14	6.32	23	55.5	16	3.73	30	22.6	26	31.10	23	61.8	1
20.6	7.09	24	50.7	18	6.52	20	57.0	15	3.99	26	25.3	27	31.29	19	62.2	4
30.6	7.27	18	52.9	22	6.68	16	58.3	13	4.21	22	28.0	27	31.45	16	63.0	8
)r. 9.5	7.40	13	55.3	24	6.81	13	59.3	10	4.38	17	30.6	26	31.57	12	64.1	11
19.5	7.47	7	57.9	26	6.90	9	60.1	8	4.50	12	33.1	25	31.66	9	65.4	13
29.5	7.48	1	60.6	27	6.97	7	60.8	7	4.58	8	35.4	23	31.71	5	66.8	14
ay 9.4	7.45	3	63.2	26	7.01	4	61.4	6	4.62	4	37.5	21	31.74	3	68.2	14
19.4	7.37	8	65.6	24	7.02	1	61.8	4	4.62	0	39.4	19	31.74	0	69.7	15
29.4	7.26	11	67.8	22	7.01	1	62.0	2	4.59	3	41.1	17	31.71	3	71.1	14
ıne 8.4	7.11	15	69.7	19	6.97	4	62.0	0	4.52	7	42.5	14	31.66	5	72.4	13
18.3	6.93	18	71.2	15	6.91	6	61.9	1	4.41	11	43.6	11	31.59	7	73.6	12
28.3	6.73	20	72.3	11	6.83	8	61.7	2	4.27	14	44.3	7	31.50	9	74.6	10
ıly 8.3	6.51	22	73.0	7	6.74	9	61.4	3	4.11	16	44.7	4	31.40	10	75.4	8
18.3	6.28	23	73.2	2	6.64	10	61.0	4	3.93	18	44.7	0	31.28	12	76.0	6
28.2	6.05	23	73.0	2	6.52	12	60.4	6	3.74	19	44.4	3	31.16	12	76.3	3
ıg. 7.2	5.82	23	72.3	7	6.40	12	59.8	6	3.54	20	43.8	6	31.03	13	76.3	0
17.2	5.59	23	71.2	11	6.28	12	59.2	6	3.34	20	42.8	10	30.90	13	76.1	2
27.1	5.38	21	69.6	16	6.17	11	58.5	7	3.15	19	41.5	13	30.78	12	75.6	5
pt. 6.1	5.20	18	67.6	20	6.08	9	57.8	7	2.99	16	39.9	16	30.68	10	74.8	8
16.1	5.05	15	65.2	24	6.01	7	57.1	7	2.86	13	38.1	18	30.60	8	73.7	11
26.1	4.94	11	62.4	28	5.96	5	56.5	6	2.77	9	36.3	18	30.54	6	72.4	13
:t. 6.0	4.87	7	59.4	30	5.95	1	56.1	4	2.74	3	34.4	19	30.52	2	70.8	16
16.0	4.86	1	56.1	33	5.99	4	55.8	3	2.77	3	32.6	18	30.54	2	68.9	19
26.0	4.91	5	52.6	35	6.08	9	55.8	0	2.86	9	30.9	17	30.60	6	66.7	22
)v. 5.0	5.02	11	49.0	36	6.21	13	56.1	3	3.02	16	29.4	15	30.71	11	64.3	24
14.9	5.20	18	45.4	36	6.39	18	56.6	5	3.25	23	28.2	12	30.87	16	61.8	25
24.9	5.45	25	41.8	36	6.62	23	57.4	8	3.55	30	27.4	8	31.08	21	59.2	26
:c. 4.9	5.75	30	38.4	34	6.90	28	58.5	11	3.90	35	27.0	4	31.33	25	56.5	27
14.8	6.10	35	35.2	32	7.21	31	59.9	14	4.30	40	27.1	1	31.62	29	53.8	27
24.8	6.50	40	32.4	28	7.54	33	61.5	16	4.73	43	27.6	5	31.93	31	51.2	26
34.8	6.93	43	30.0	24	7.89	35	63.3	18	5.18	45	28.5	9	32.27	34	48.7	25
J, Tan δ	1.548		+1.181		1.050		−0.319		1.462		−1.067		1.057		+0.341	
n Place	4ˢ.501		67″.73		5ˢ.217		46″.06		2ˢ.596		20″.21		29ˢ.684		78″.57	
z, $D_{\omega} \alpha$	−0.01		+0.06		0.00		−0.02		+0.01		−0.06		0.00		+0.02	
, $D_{\omega} \delta$	−0.04		−0.4		−0.4		−0.4		−0.4		−0.5		−0.4		−0.5	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	θ Apodis. Var. 5.5–6.6				τ Virginis. Mag. 4.3				11 Boötis. Mag. 6.1				β Centauri. Mag. 0.9			
	Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination S.	
	h m 13 56 s		° ′ −76 22 ″		h m 13 57 s		° ′ + 1 57 ″		h m 13 57 s		° ′ +27 48 ″		h m 13 57 s		° ′ −59 56 ″	
Jan. 0.8	38.34		4.1		9.11		68.8		10.42		29.0		33.88		41.4	
10.8	39.44	110	4.5	4	9.45	34	66.6	22	10.78	36	26.7	23	34.47	59	42.2	8
20.7	40.57	113	5.4	9	9.78	33	64.6	20	11.14	36	24.7	20	35.05	58	43.5	13
30.7	41.67	110	6.8	14	10.11	33	62.8	18	11.49	35	23.2	15	35.62	57	45.2	17
Feb. 9.7	42.72	105	8.8	20	10.43	32	61.2	16	11.83	34	22.2	10	36.16	54	47.3	21
19.7	43.69	97	11.2	24	10.72	29	59.8	14	12.14	31	21.7	5	36.66	50	49.7	24
29.6	44.57	88	14.0	28	10.98	26	58.8	10	12.42	28	21.6	1	37.12	46	52.4	27
Mar. 10.6	45.35	78	17.0	30	11.21	23	58.1	7	12.67	25	22.1	5	37.52	40	55.3	29
20.6	46.01	66	20.3	33	11.41	20	57.7	4	12.88	21	23.0	9	37.86	34	58.3	30
30.6	46.55	54	23.8	35	11.57	16	57.5	2	13.05	17	24.2	12	38.15	29	61.4	31
Apr. 9.5	46.95	40	27.3	35	11.70	13	57.6	1	13.18	13	25.7	15	38.38	23	64.5	31
19.5	47.22	27	30.9	36	11.80	10	58.0	4	13.27	9	27.4	17	38.55	17	67.5	30
29.5	47.36	14	34.4	35	11.87	7	58.5	5	13.33	6	29.3	19	38.65	10	70.4	29
May 9.4	47.36	0	37.7	33	11.91	4	59.1	6	13.35	2	31.2	19	38.69	4	73.2	28
19.4	47.23	13	40.8	31	11.93	2	59.8	7	13.34	1	33.1	19	38.68	1	75.7	25
29.4	46.98	25	43.7	29	11.92	1	60.5	7	13.30	4	34.9	18	38.62	6	78.0	23
June 8.4	46.61	37	46.3	26	11.89	3	61.3	8	13.24	6	36.5	16	38.50	12	80.0	20
18.3	46.13	48	48.5	22	11.84	5	62.1	8	13.16	8	37.9	14	38.33	17	81.6	16
28.3	45.55	58	50.2	17	11.77	7	62.8	7	13.06	10	39.1	12	38.11	22	82.8	12
July 8.3	44.89	66	51.5	13	11.69	8	63.4	6	12.94	12	40.0	9	37.86	25	83.6	8
18.3	44.18	71	52.2	7	11.59	10	64.0	6	12.80	14	40.6	6	37.58	28	84.0	4
28.2	43.43	75	52.4	2	11.48	11	64.5	5	12.66	14	40.8	2	37.28	30	83.9	1
Aug. 7.2	42.67	76	52.1	3	11.36	12	64.9	4	12.51	15	40.7	1	36.97	31	83.4	5
17.2	41.93	74	51.2	9	11.25	11	65.1	2	12.36	15	40.3	4	36.67	30	82.5	9
27.1	41.23	70	49.8	14	11.14	11	65.2	1	12.22	14	39.6	7	36.38	29	81.1	14
Sept. 6.1	40.61	62	48.0	18	11.04	10	65.1	1	12.10	12	38.5	11	36.13	25	79.4	17
16.1	40.09	52	45.8	22	10.96	8	64.8	3	12.00	10	37.1	14	35.92	21	77.4	2
26.1	39.71	38	43.3	25	10.91	5	64.4	4	11.93	7	35.3	18	35.77	15	75.2	2
Oct. 6.0	39.48	23	40.6	27	10.89	2	63.7	7	11.89	4	33.2	21	35.69	8	72.9	2
16.0	39.42	6	37.7	29	10.91	2	62.8	9	11.89	0	30.9	23	35.70	1	70.5	2
26.0	39.55	13	34.9	28	10.97	6	61.6	12	11.94	5	28.3	26	35.79	9	68.2	2
Nov. 5.0	39.86	31	32.2	27	11.08	11	60.2	14	12.04	10	25.5	28	35.98	19	66.1	2
14.9	40.35	49	29.7	25	11.24	16	58.6	16	12.19	15	22.6	29	36.26	28	64.2	1
24.9	41.01	66	27.6	21	11.45	21	56.7	19	12.39	20	19.6	30	36.62	36	62.7	1
Dec. 4.9	41.82	81	25.9	17	11.70	25	54.7	20	12.64	25	16.6	30	37.05	43	61.7	1
14.8	42.76	94	24.7	12	11.98	28	52.6	21	12.93	29	13.6	30	37.55	50	61.1	
24.8	43.80	104	24.1	6	12.29	31	50.4	22	13.25	32	10.8	28	38.10	55	61.0	
34.8	44.90	110	24.0	1	12.62	33	48.2	22	13.60	35	8.3	25	38.67	57	61.5	
Sec δ, Tan δ	4.245		−4.126		1.001		+0.034		1.131		+0.527		1.997		−1.729	
Mean Place	43ˢ.007		21″.22		10ˢ.012		72″.09		11ˢ.121		40″.39		36ˢ.206		56″.08	
D′ψ α, Dω α	+0.05		−0.24		0.00		0.00		−0.01		+0.03		+0.02		−0.10	
Dψ δ, Dω δ	−0.3		−0.5		−0.3		−0.5		−0.3		−0.5		−0.3		−0.5	

FOR THE UPPER TRANSIT AT WASHINGTON.

an Solar Date.	π Hydræ. Mag. 3.5				θ Centauri. Mag. 2.3				α Draconis. Mag. 3.6				d Boötis. Mag. 4.8			
	Right Ascension.		Declination S.		Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination N.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	14 1		−26 15		14 1		−35 56		14 1		+64 47		14 6		+25 29	
	s		″		s		″		s		″		s		″	
n. 0.8	20.13		26.2		28.48		6.1		59.95		27.2		22.41		78.2	
10.8	20.50	37	27.8	16	28.87	39	7.5	14	60.54	59	25.1	21	22.75	34	75.8	24
20.8	20.87	37	29.6	18	29.27	40	9.2	17	61.15	61	23.6	15	23.10	35	73.8	20
30.7	21.23	36	31.5	19	29.66	39	11.1	19	61.75	60	22.8	8	23.45	35	72.2	16
b. 9.7	21.57	34	33.5	20	30.03	37	13.2	21	62.34	59	22.7	1	23.79	34	71.1	11
19.7	21.89	32	35.5	20	30.37	34	15.4	22	62.90	56	23.2	5	24.10	31	70.4	7
29.6	22.18	29	37.5	20	30.68	31	17.6	22	63.41	51	24.3	11	24.39	29	70.2	2
ır.10.6	22.44	26	39.4	19	30.96	28	19.9	23	63.85	44	26.0	17	24.64	25	70.5	3
20.6	22.66	22	41.2	18	31.20	24	22.1	22	64.21	36	28.2	22	24.85	21	71.2	7
30.6	22.84	18	42.9	17	31.40	20	24.2	21	64.48	27	30.7	25	25.03	18	72.3	11
r. 9.5	22.99	15	44.4	15	31.56	16	26.3	21	64.67	19	33.5	28	25.17	14	73.7	14
19.5	23.11	12	45.8	14	31.69	13	28.2	19	64.77	10	36.5	30	25.27	10	75.3	16
29.5	23.20	9	47.0	12	31.78	9	29.9	17	64.78	1	39.5	30	25.34	7	77.1	18
ay 9.5	23.26	6	48.0	10	31.84	6	31.5	16	64.70	8	42.4	29	25.37	3	78.9	18
19.4	23.29	3	48.8	8	31.86	2	32.9	14	64.55	15	45.1	27	25.37	0	80.8	19
29.4	23.29	0	49.5	7	31.85	1	34.1	12	64.34	21	47.6	25	25.34	3	82.6	18
ne 8.4	23.26	3	50.0	5	31.81	4	35.0	9	64.07	27	49.7	21	25.29	5	84.2	16
18.3	23.20	6	50.3	3	31.75	6	35.7	7	63.74	33	51.4	17	25.22	7	85.6	14
28.3	23.12	8	50.4	1	31.66	9	36.2	5	63.38	36	52.6	12	25.13	9	86.8	12
ly 8.3	23.03	9	50.3	1	31.54	12	36.4	2	62.99	39	53.3	7	25.02	11	87.7	9
18.3	22.92	11	50.1	2	31.40	14	36.3	1	62.58	41	53.5	2	24.89	13	88.4	7
28.2	22.79	13	49.7	4	31.25	15	36.0	3	62.15	43	53.2	3	24.75	14	88.7	3
ug. 7.2	22.66	13	49.1	6	31.09	16	35.4	6	61.73	42	52.4	8	24.60	15	88.7	0
17.2	22.52	14	48.4	7	30.93	16	34.6	8	61.32	41	51.1	13	24.46	14	88.4	3
27.2	22.39	13	47.5	9	30.78	15	33.6	10	60.94	38	49.3	18	24.32	14	87.8	6
pt. 6.1	22.27	12	46.6	9	30.64	14	32.4	12	60.59	35	47.0	23	24.19	13	86.8	10
16.1	22.18	9	45.6	10	30.53	11	31.1	13	60.28	31	44.3	27	24.08	11	85.5	13
26.1	22.12	6	44.7	9	30.45	8	29.7	14	60.03	25	41.3	30	24.00	8	83.9	16
ct. 6.0	22.10	2	43.8	9	30.42	3	28.4	13	59.85	18	38.0	33	23.96	4	82.0	19
16.0	22.12	2	43.1	7	30.44	2	27.1	13	59.75	10	34.4	36	23.96	0	79.8	22
26.0	22.19	7	42.5	6	30.51	7	26.0	11	59.73	2	30.6	38	24.00	4	77.4	24
ov. 5.0	22.31	12	42.2	3	30.64	13	25.1	9	59.80	7	26.7	39	24.09	9	74.7	27
14.9	22.49	18	42.1	1	30.83	19	24.5	6	59.97	17	22.8	39	24.23	14	71.9	28
24.9	22.72	23	42.3	2	31.08	25	24.2	3	60.23	26	19.0	38	24.42	19	69.0	29
ec. 4.9	23.00	28	42.9	6	31.38	30	24.3	1	60.58	35	15.4	36	24.66	24	66.0	30
14.9	23.32	32	43.8	9	31.72	34	24.7	4	61.02	44	12.1	33	24.94	28	63.1	29
24.8	23.66	34	45.0	12	32.09	37	25.5	8	61.52	50	9.2	29	25.26	32	60.3	28
34.8	24.02	36	46.5	15	32.49	40	26.7	12	62.08	56	6.7	25	25.59	33	57.8	25
δ, Tan δ	1.115		−0.493		1.235		−0.725		2.348		+2.124		1.108		+0.478	
n Place	21ˢ.397		31″.98		29ˢ.921		14″.78		60ˢ.431		46″.30		23ˢ.178		89″.03	
a, D$_\omega$ a	+0.01		−0.03		+0.01		−0.04		−0.03		+0.12		−0.01		+0.03	
δ, D$_\omega$ δ	−0.3		−0.5		−0.3		−0.5		−0.3		−0.5		−0.3		−0.5	

Mean Solar Date.	κ Virginis. Mag. 4.3				4 Ursæ Minoris. Mag. 5.0				ι Virginis. Mag. 4.2				α Boötis. Mag. 0.2			
	Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination N.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	14 8		− 9 51		14 9		+77 56		14 11		− 5 34		14 11		+19 37	
	s		″		s		″		s		″		s		″	
Jan. 0.8	10.89	34	52.1	19	9.94	105	79.2	19	22.83	33	52.8	20	37.98	34	75.2	24
10.8	11.23	34	54.0	19	10.99	111	77.3	13	23.16	34	54.8	20	38.32	34	72.8	21
20.8	11.57	34	55.9	19	12.10	113	76.0	6	23.50	34	56.8	19	38.66	34	70.7	18
30.7	11.91	32	57.8	18	13.23	112	75.4	1	23.84	32	58.7	17	39.00	32	68.9	14
Feb. 9.7	12.23	30	59.6	17	14.35	106	75.5	7	24.16	29	60.4	15	39.32	30	67.5	9
19.7	12.53	27	61.3	14	15.41	96	76.2	13	24.45	27	61.9	13	39.62	28	66.6	4
29.6	12.80	24	62.7	12	16.37	84	77.5	19	24.72	24	63.2	11	39.90	25	66.2	0
Mar. 10.6	13.04	21	63.9	10	17.21	69	79.4	24	24.96	21	64.3	8	40.15	21	66.2	4
20.6	13.25	18	64.9	8	17.90	51	81.8	27	25.17	18	65.1	6	40.36	17	66.6	8
30.6	13.43	15	65.7	6	18.41	33	84.5	29	25.35	15	65.7	3	40.53	14	67.4	10
Apr. 9.5	13.58	11	66.3	4	18.74	14	87.4	30	25.50	12	66.0	1	40.67	11	68.4	13
19.5	13.69	9	66.7	2	18.88	5	90.4	31	25.62	9	66.1	1	40.78	7	69.7	14
29.5	13.78	6	66.9	0	18.83	23	93.5	30	25.71	6	66.0	2	40.85	4	71.1	15
May 9.5	13.84	3	66.9	1	18.60	39	96.5	28	25.77	3	65.8	3	40.89	2	72.6	16
19.4	13.87	1	66.8	2	18.21	54	99.3	24	25.80	1	65.5	4	40.91	2	74.2	15
29.4	13.88	2	66.6	3	17.67	67	101.7	21	25.81	2	65.1	4	40.89	4	75.7	14
June 8.4	13.86	4	66.3	4	17.00	77	103.8	16	25.79	4	64.7	5	40.85	6	77.1	13
18.3	13.82	6	65.9	4	16.23	86	105.4	12	25.75	6	64.2	5	40.79	8	78.4	11
28.3	13.76	8	65.5	4	15.37	93	106.6	6	25.69	8	63.7	6	40.71	10	79.5	8
July 8.3	13.68	10	65.1	5	14.44	96	107.2	1	25.61	10	63.1	5	40.61	12	80.3	6
18.3	13.58	11	64.6	5	13.48	98	107.3	5	25.51	11	62.6	5	40.49	13	80.9	4
28.2	13.47	11	64.1	5	12.50	98	106.8	10	25.40	11	62.1	4	40.36	14	81.3	1
Aug. 7.2	13.36	12	63.6	4	11.52	95	105.8	15	25.29	12	61.7	4	40.22	14	81.4	2
17.2	13.24	12	63.2	4	10.57	89	104.3	20	25.17	11	61.3	3	40.08	13	81.2	5
27.2	13.12	11	62.8	4	9.68	82	102.3	24	25.06	10	61.0	2	39.95	12	80.7	7
Sept. 6.1	13.01	9	62.4	3	8.86	73	99.9	29	24.96	9	60.8	0	39.83	10	80.0	10
16.1	12.92	6	62.1	2	8.13	62	97.0	32	24.87	7	60.8	1	39.73	8	79.0	14
26.1	12.86	3	61.9	0	7.51	48	93.8	35	24.80	4	60.9	2	39.65	5	77.6	17
Oct. 6.0	12.83	1	61.9	2	7.03	33	90.3	37	24.76	1	61.1	4	39.60	1	75.9	19
16.0	12.84	6	62.1	4	6.70	17	86.6	39	24.77	6	61.5	7	39.59	4	74.0	22
26.0	12.90	11	62.5	7	6.53	1	82.7	39	24.83	10	62.2	10	39.63	9	71.8	24
Nov. 5.0	13.01	16	63.2	9	6.54	19	78.8	39	24.93	15	63.2	12	39.72	13	69.4	26
14.9	13.17	20	64.1	12	6.73	38	74.9	38	25.08	19	64.4	14	39.85	18	66.8	28
24.9	13.37	25	65.3	14	7.11	56	71.1	36	25.27	24	65.8	16	40.03	23	64.0	28
Dec. 4.9	13.62	28	66.7	16	7.67	72	67.5	32	25.51	28	67.4	18	40.26	27	61.2	28
14.9	13.90	31	68.3	18	8.39	86	64.3	28	25.79	31	69.2	19	40.53	30	58.4	27
24.8	14.21	34	70.1	19	9.25	99	61.5	23	26.10	33	71.1	20	40.83	33	55.7	25
34.8	14.55		72.0		10.24		59.2		26.43		73.1		41.16		53.2	
Sec δ, Tan δ	1.015		−0.174		4.793		+4.687		1.005		−0.098		1.062		+0.357	
Mean Place	$11^{\mathrm{s}}.971$		$52''.32$		$10^{\mathrm{s}}.463$		$99''.48$		$23^{\mathrm{s}}.880$		$51''.51$		$38^{\mathrm{s}}.823$		$84''.52$	
$D'_\psi \alpha$, $D_\omega \alpha$	0.00		−0.01		−0.07		+0.26		0.00		−0.01		−0.01		+0.02	
$D_\psi \delta$, $D_\omega \delta$	−0.3		−0.5		−0.3		−0.5		−0.3		−0.5		−0.3		−0.5	

FOR THE UPPER TRANSIT AT WASHINGTON.

ean Solar Date.	λ Boötis. Mag. 4.3				λ Virginis. Mag. 4.6				2 Libræ. Mag. 6.3				θ Boötis. Mag. 4.1			
	Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination S.		Right Ascension.		Declination N.	
	h m 14 13		° ′ +46 28		h m 14 14		° ′ −12 57		h m 14 18		° ′ −11 18		h m 14 22		° ′ +52 14	
	s		″		s		″		s		″		s		″	
n. 0.8	1.69		75.1		19.56		58.3		40.20		44.9		11.35		68.4	
10.8	2.10	41	72.7	24	19.90	34	60.2	19	40.54	34	46.7	18	11.80	45	65.9	25
20.8	2.52	42	70.8	19	20.24	34	62.1	19	40.89	35	48.6	19	12.25	45	64.0	19
30.7	2.94	42	69.5	13	20.58	34	64.0	19	41.23	34	50.5	19	12.70	45	62.7	13
b. 9.7	3.34	40	68.8	7	20.91	33	65.8	18	41.55	32	52.3	18	13.14	44	62.0	7
19.7	3.72	38	68.8	0	21.21	30	67.5	17	41.85	30	53.9	16	13.56	42	62.0	0
29.7	4.07	35	69.3	5	21.49	28	69.0	15	42.13	28	55.4	15	13.95	39	62.6	6
ar. 10.6	4.38	31	70.3	10	21.74	25	70.3	13	42.38	25	56.7	13	14.30	35	63.7	11
20.6	4.64	26	71.9	16	21.96	22	71.4	11	42.60	22	57.7	10	14.60	30	65.3	16
30.6	4.86	22	73.9	20	22.15	19	72.3	9	42.79	19	58.5	8	14.84	24	67.4	21
r. 9.5	5.02	16	76.2	23	22.31	16	73.0	7	42.95	16	59.1	6	15.02	18	69.9	25
19.5	5.13	11	78.7	25	22.43	12	73.6	6	43.08	13	59.5	4	15.14	12	72.6	27
29.5	5.19	6	81.3	26	22.52	9	74.0	4	43.18	10	59.8	3	15.20	6	75.4	28
ay 9.5	5.20	1	83.9	26	22.58	6	74.2	2	43.25	7	60.0	2	15.21	1	78.1	27
19.4	5.16	4	86.4	25	22.62	4	74.3	1	43.29	4	59.9	1	15.17	4	80.8	27
29.4	5.09	7	88.8	24	22.63	1	74.2	1	43.31	2	59.8	1	15.08	9	83.3	25
ne 8.4	4.98	11	90.9	21	22.62	1	74.1	1	43.30	1	59.6	2	14.95	13	85.6	23
18.4	4.84	14	92.7	18	22.58	4	73.9	2	43.27	3	59.3	3	14.78	17	87.5	19
28.3	4.67	17	94.1	14	22.52	6	73.6	3	43.21	6	58.9	4	14.58	20	89.0	15
ly 8.3	4.48	19	95.1	10	22.44	8	73.2	4	43.13	8	58.5	4	14.35	23	90.1	11
18.3	4.27	21	95.7	6	22.35	9	72.8	4	43.03	10	58.1	4	14.10	25	90.7	6
28.2	4.05	22	95.9	2	22.24	11	72.4	4	42.92	11	57.7	4	13.83	27	90.9	2
g. 7.2	3.82	23	95.6	3	22.12	12	71.9	5	42.80	12	57.2	5	13.56	27	90.6	3
17.2	3.59	23	94.8	8	21.99	13	71.4	5	42.67	13	56.7	5	13.29	27	89.8	8
27.2	3.37	22	93.6	12	21.87	12	70.9	5	42.55	12	56.3	4	13.03	26	88.5	13
pt. 6.1	3.17	20	92.0	16	21.76	11	70.4	5	42.44	11	55.9	4	12.78	25	86.8	17
16.1	3.00	17	90.0	20	21.67	9	70.0	4	42.35	9	55.6	3	12.56	22	84.6	22
26.1	2.86	14	87.6	24	21.60	7	69.7	3	42.28	7	55.4	2	12.38	18	82.0	26
t. 6.1	2.76	10	84.8	28	21.57	3	69.6	1	42.24	4	55.3	1	12.24	14	79.1	29
16.0	2.71	5	81.7	31	21.58	1	69.6	0	42.24	0	55.4	1	12.16	8	75.9	32
26.0	2.72	1	78.4	33	21.63	5	69.8	2	42.29	5	55.7	3	12.14	2	72.5	34
v. 5.0	2.79	7	74.9	35	21.73	10	70.3	5	42.39	10	56.3	6	12.19	5	68.9	36
14.9	2.92	13	71.3	36	21.89	16	71.0	7	42.54	15	57.1	8	12.30	11	65.1	38
24.9	3.12	20	67.7	36	22.09	20	72.0	10	42.73	19	58.1	10	12.49	19	61.3	38
c. 4.9	3.38	26	64.2	35	22.33	24	73.2	12	42.97	24	59.4	13	12.75	26	57.7	36
14.9	3.69	31	60.9	33	22.61	28	74.6	14	43.25	28	60.9	15	13.06	31	54.3	34
24.8	4.04	35	57.9	30	22.92	31	76.2	16	43.56	31	62.6	17	13.43	37	51.2	31
34.8	4.43	39	55.2	27	23.26	34	78.0	18	43.89	33	64.4	18	13.84	41	48.4	28
δ, Tan δ	1.452		+1.053		1.026		−0.230		1.020		−0.200		1.633		+1.292	
n Place	2ˢ.390		91″.30		20ˢ.708		59″.35		41ˢ.360		45″.17		12ˢ.113		85″.75	
a, Dω a	−0.02		+0.06		0.00		−0.01		0.00		−0.01		−0.02		+0.07	
δ, Dω δ	−0.3		−0.5		−0.3		−0.6		−0.3		−0.6		−0.3		−0.6	

Mean Solar Date.	*f* Boötis. Mag. 5.4				φ Virginis. Mag. 5.0				δ Ursæ Minoris. Mag. 4.4				ρ Boötis. Mag. 3.8		
	Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Dec tion
	h m 14 22		° ' +19 36		h m 14 23		° ' − 1 50		h m 14 27		° ' +76 4		h m 14 28		° +30
	s		"		s		"		s		"		s		"
Jan. 0.8	20.85		70.0		38.94		4.9		40.81		54.1		1.40		73.5
10.8	21.18	33	67.7	23	39.26	32	7.0	21	41.71	90	51.9	22	1.75	35	71.0
20.8	21.52	34	65.6	21	39.60	34	9.0	20	42.66	95	50.3	16	2.10	35	68.9
30.7	21.86	34	63.8	18	39.93	33	10.8	18	43.64	98	49.4	9	2.46	36	67.2
Feb. 9.7	22.19	33	62.4	14	40.25	32	12.4	16	44.63	99	49.2	2	2.81	35	66.1
19.7	22.50	31	61.5	9	40.55	30	13.8	14	45.58	95	49.6	4	3.14	33	65.4
29.7	22.79	29	61.1	4	40.83	28	15.0	12	46.46	88	50.7	11	3.45	31	65.3
Mar. 10.6	23.05	26	61.1	0	41.08	25	15.9	9	47.24	78	52.3	16	3.72	27	65.7
20.6	23.27	22	61.5	4	41.30	22	16.5	6	47.89	65	54.5	22	3.96	24	66.6
30.6	23.45	18	62.3	8	41.48	18	16.8	3	48.40	51	57.1	26	4.16	20	67.9
Apr. 9.6	23.60	15	63.4	11	41.64	16	16.9	1	48.76	36	60.0	29	4.32	16	69.5
19.5	23.72	12	64.7	13	41.77	13	16.8	1	48.96	20	63.0	30	4.45	13	71.4
29.5	23.81	9	66.2	15	41.87	10	16.5	3	49.00	4	66.1	31	4.54	9	73.5
May 9.5	23.87	6	67.8	16	41.94	7	16.0	5	48.89	11	69.1	30	4.59	5	75.6
19.4	23.89	2	69.5	17	41.98	4	15.4	6	48.62	27	72.0	29	4.60	1	77.7
29.4	23.88	1	71.1	16	41.99	1	14.8	6	48.22	40	74.6	26	4.58	2	79.8
June 8.4	23.85	3	72.6	15	41.98	0	14.2	6	47.70	52	76.9	23	4.54	4	81.7
18.4	23.80	5	74.0	14	41.95	3	13.5	7	47.08	62	78.8	19	4.47	7	83.4
28.3	23.73	7	75.2	12	41.90	5	12.8	7	46.37	71	80.2	14	4.37	10	84.8
July 8.3	23.63	10	76.2	10	41.82	8	12.2	6	45.60	77	81.1	9	4.25	12	85.9
18.3	23.51	12	77.0	8	41.73	9	11.6	6	44.78	82	81.5	4	4.11	14	86.7
28.3	23.38	13	77.5	5	41.62	11	11.1	5	43.93	85	81.3	2	3.95	16	87.2
Aug. 7.2	23.24	14	77.7	2	41.50	12	10.7	4	43.07	86	80.6	7	3.79	16	87.3
17.2	23.10	14	77.6	1	41.38	12	10.4	3	42.23	84	79.4	12	3.63	16	87.0
27.2	22.97	13	77.2	4	41.26	12	10.2	2	41.42	81	77.7	17	3.47	16	86.4
Sept. 6.1	22.84	13	76.5	7	41.15	11	10.1	1	40.66	76	75.5	22	3.31	16	85.4
16.1	22.73	11	75.5	10	41.05	10	10.2	1	39.97	69	72.9	26	3.17	14	84.0
26.1	22.64	9	74.2	13	40.97	8	10.4	2	39.37	60	69.9	30	3.06	11	82.3
Oct. 6.1	22.58	6	72.7	15	40.92	5	10.8	4	38.89	48	66.6	33	2.98	8	80.3
16.0	22.56	2	70.9	18	40.92	0	11.5	7	38.53	36	63.0	36	2.94	4	77.9
26.0	22.59	3	68.8	21	40.96	4	12.4	9	38.31	22	59.2	38	2.95	1	75.3
Nov. 5.0	22.67	8	66.5	23	41.05	9	13.5	11	38.25	6	55.3	39	3.02	7	72.4
15.0	22.80	13	64.0	25	41.18	13	14.8	13	38.35	10	51.3	40	3.13	11	69.4
24.9	22.97	17	61.3	27	41.36	18	16.4	16	38.61	26	47.5	38	3.30	17	66.3
Dec. 4.9	23.19	22	58.5	28	41.59	23	18.2	18	39.03	42	43.8	37	3.52	22	63.1
14.9	23.45	26	55.7	28	41.86	27	20.1	19	39.61	58	40.4	34	3.78	26	60.0
24.8	23.75	30	53.0	27	42.16	30	22.1	20	40.32	71	37.4	30	4.08	30	57.0
34.8	24.08	33	50.5	25	42.48	32	24.2	21	41.14	82	34.9	25	4.42	34	54.3
Sec δ, Tan δ	1.062		+0.356		1.001		−0.032		4.158		+4.036		1.164		+0.59
Mean Place	$21^{s}.752$		$79''.52$		$40^{s}.014$		$1''.99$		$41^{s}.796$		$74''.16$		$2^{s}.276$		$86''.17$
$D'_{\psi} a$, $D_{\omega} a$	−0.01		+0.02		0.00		0.00		−0.06		+0.22		−0.01		+0.03
$D_{\psi} \delta$, $D_{\omega} \delta$	−0.3		−0.6		−0.3		−0.6		−0.3		−0.6		−0.3		−0.6

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	γ Boötis. Mag. 3.0				η Centauri. Mag. 2.6				σ Boötis. Mag. 4.5				α² Centauri. Mag. 0.3			
	Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination S.	
	h m 14 28		° ′ +38 41		h m 14 29		° ′ −41 46		h m 14 30		° ′ +30 7		h m 14 33		° ′ −60 28	
	s		″		s		″		s		″		s		″	
Jan. 0.8	31.26		19.4		53.06		9.7		50.07		24.7		34.84		2.2	
10.8	31.63	37	16.9	25	53.48	42	10.6	9	50.41	34	22.2	25	35.41	57	2.5	3
20.8	32.01	38	14.8	21	53.90	42	11.8	12	50.77	36	20.1	21	36.00	59	3.3	8
30.7	32.39	38	13.2	16	54.32	42	13.4	16	51.13	36	18.4	17	36.58	58	4.6	13
Feb. 9.7	32.76	37	12.2	10	54.73	41	15.2	18	51.48	35	17.2	12	37.14	56	6.3	17
19.7	33.11	35	11.8	4	55.12	39	17.2	20	51.81	33	16.5	7	37.67	53	8.4	21
29.7	33.44	33	12.0	2	55.48	36	19.3	21	52.12	31	16.4	1	38.17	50	10.7	23
Mar. 10.6	33.74	30	12.6	6	55.81	33	21.5	22	52.39	27	16.8	4	38.62	45	13.2	25
20.6	34.00	26	13.8	12	56.10	29	23.7	22	52.63	24	17.6	8	39.01	39	15.9	27
30.6	34.21	21	15.5	17	56.35	25	25.9	22	52.83	20	18.8	12	39.34	33	18.8	29
Apr. 9.6	34.38	17	17.5	20	56.56	21	28.1	22	53.00	17	20.4	16	39.62	28	21.7	29
19.5	34.51	13	19.7	22	56.73	17	30.2	21	53.13	13	22.3	19	39.84	22	24.6	29
29.5	34.59	8	22.0	23	56.87	14	32.2	20	53.22	9	24.3	20	39.99	15	27.4	28
May 9.5	34.63	4	24.4	24	56.97	10	34.1	19	53.28	6	26.4	21	40.08	9	30.1	27
19.4	34.63	0	26.8	24	57.03	6	35.8	17	53.30	2	28.5	21	40.11	3	32.7	26
29.4	34.60	3	29.1	23	57.05	2	37.3	15	53.28	2	30.5	20	40.08	3	35.1	24
June 8.4	34.54	6	31.2	21	57.04	1	38.6	13	53.24	4	32.4	19	39.99	9	37.2	21
18.4	34.44	10	33.1	19	56.99	5	39.7	11	53.17	7	34.1	17	39.85	14	39.0	18
28.3	34.31	13	34.6	15	56.90	9	40.5	8	53.08	9	35.6	15	39.66	19	40.4	14
July 8.3	34.16	15	35.8	12	56.78	12	41.0	5	52.96	12	36.8	12	39.42	24	41.5	11
18.3	33.99	17	36.6	8	56.64	14	41.2	2	52.82	14	37.6	8	39.14	28	42.2	7
28.3	33.81	18	37.0	4	56.48	16	41.2	0	52.67	15	38.1	5	38.83	31	42.4	2
Aug. 7.2	33.62	19	37.0	0	56.30	18	40.9	3	52.51	16	38.2	1	38.50	33	42.2	2
17.2	33.43	19	36.6	4	56.11	19	40.2	7	52.34	17	38.0	2	38.17	33	41.6	6
27.2	33.24	19	35.7	9	55.93	18	39.3	9	52.17	17	37.4	6	37.85	32	40.5	11
Sept. 6.1	33.06	18	34.4	13	55.76	17	38.2	11	52.02	15	36.4	10	37.55	30	39.0	15
16.1	32.90	16	32.8	16	55.61	15	36.9	13	51.89	13	35.1	13	37.29	26	37.2	18
26.1	32.76	14	30.8	20	55.49	12	35.4	15	51.78	11	33.4	17	37.08	21	35.2	20
Oct. 6.1	32.66	10	28.4	24	55.42	7	33.8	16	51.70	8	31.4	20	36.94	14	33.0	22
16.0	32.61	5	25.7	27	55.41	1	32.3	15	51.66	4	29.1	23	36.88	6	30.7	23
26.0	32.61	0	22.7	30	55.45	4	30.9	14	51.67	1	26.5	26	36.91	3	28.4	23
Nov. 5.0	32.67	6	19.5	32	55.55	10	29.6	13	51.73	6	23.7	28	37.03	12	26.2	22
15.0	32.79	12	16.2	33	55.72	17	28.5	11	51.84	11	20.7	30	37.25	22	24.2	20
24.9	32.95	16	12.8	34	55.95	23	27.7	8	52.01	17	17.6	31	37.56	31	22.5	17
Dec. 4.9	33.17	22	9.5	33	56.24	29	27.3	4	52.23	22	14.4	32	37.95	39	21.1	14
14.9	33.44	27	6.3	32	56.58	34	27.2	1	52.49	26	11.3	31	38.41	46	20.1	10
24.8	33.76	32	3.2	31	56.96	38	27.5	3	52.79	30	8.4	29	38.93	52	19.6	5
34.8	34.12	36	0.3	29	57.38	42	28.2	7	53.12	33	5.7	27	39.51	58	19.7	1
Sec δ, Tan δ	1.281		+0.801		1.341		−0.893		1.156		+0.580		2.029		−1.766	
Mean Place	32ˢ.114		34″.06		54ˢ.840		18″.26		50ˢ.970		37″.24		36ˢ.781		21″.83	
$D'_\psi\alpha$, $D_\omega\alpha$	−0.01		+0.04		+0.01		−0.05		−0.01		+0.03		+0.03		−0.	
$D_\psi\delta$, $D_\omega\delta$	−0.3		−0.6		−0.3		−0.6		−0.3		−0.6		−0.3		−0.	

Mean Solar Date.	33 Boötis. Mag. 5.4				α Apodis. Mag. 3.8				μ Virginis. Mag. 4.0				ε Boötis. Mag. 2.7			
	Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination S.		Right Ascension.		Declination N.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	14 35		+44 46		14 36		−78 40		14 38		− 5 16		14 41		+27 26	
	s		″		s		″		s		″		s		″	
Jan. 0.8	32.91		45.8		46.00		5.3		24.07		36.4		7.66		29.0	
10.8	33.29	38	43.2	26	47.29	129	5.0	3	24.40	33	38.4	20	7.99	33	26.4	26
20.8	33.69	40	41.1	21	48.62	133	5.2	2	24.73	33	40.3	19	8.34	35	24.2	22
30.8	34.10	41	39.5	16	49.97	135	6.0	8	25.06	33	42.1	18	8.69	35	22.4	18
Feb. 9.7	34.50	40	38.5	10	51.29	132	7.3	13	25.39	33	43.8	17	9.03	34	21.1	13
19.7	34.88	38	38.2	3	52.56	127	9.1	18	25.70	31	45.3	15	9.36	33	20.4	7
29.7	35.24	36	38.5	3	53.75	119	11.4	23	25.98	28	46.5	12	9.66	30	20.1	3
Mar. 10.6	35.56	32	39.3	8	54.84	109	14.0	26	26.24	26	47.5	10	9.94	28	20.3	2
20.6	35.84	28	40.7	14	55.81	97	16.9	29	26.48	24	48.2	7	10.18	24	21.0	7
30.6	36.07	23	42.5	18	56.65	84	20.1	32	26.68	20	48.7	5	10.39	21	22.1	11
Apr. 9.6	36.26	19	44.6	21	57.34	69	23.4	33	26.85	17	49.0	3	10.57	18	23.6	15
19.5	36.40	14	47.0	24	57.87	53	26.8	34	27.00	15	49.0	0	10.71	14	25.3	17
29.5	36.49	9	49.6	26	58.24	37	30.3	35	27.12	12	48.8	2	10.81	10	27.2	19
May 9.5	36.53	4	52.3	27	58.44	20	33.7	34	27.20	8	48.6	2	10.88	7	29.2	20
19.4	36.53	0	54.9	26	58.48	4	37.0	33	27.25	5	48.2	4	10.91	3	31.2	20
29.4	36.48	5	57.3	24	58.35	13	40.1	31	27.28	3	47.7	5	10.91	0	33.2	20
June 8.4	36.40	8	59.5	22	58.06	29	43.0	29	27.29	1	47.2	5	10.88	3	35.1	19
18.4	36.29	11	61.5	20	57.62	44	45.6	26	27.27	2	46.6	6	10.82	6	36.8	17
28.3	36.14	15	63.2	17	57.04	58	47.8	22	27.22	5	46.1	5	10.74	8	38.3	15
July 8.3	35.96	18	64.5	13	56.34	70	49.5	17	27.15	7	45.6	5	10.63	11	39.5	12
18.3	35.76	20	65.3	8	55.54	80	50.8	13	27.06	9	45.1	5	10.50	13	40.4	9
28.3	35.55	21	65.7	4	54.66	88	51.5	7	26.96	10	44.6	5	10.36	14	41.0	6
Aug. 7.2	35.33	22	65.7	0	53.74	92	51.7	2	26.84	12	44.2	4	10.21	15	41.2	2
17.2	35.10	23	65.2	5	52.80	94	51.4	3	26.71	13	43.8	4	10.04	17	41.1	1
27.2	34.87	23	64.3	9	51.89	91	50.6	8	26.58	13	43.5	3	9.88	16	40.6	5
Sept. 6.1	34.66	21	62.9	14	51.04	85	49.2	14	26.46	12	43.3	2	9.73	15	39.8	8
16.1	34.47	19	61.1	18	50.29	75	47.3	19	26.35	11	43.3	0	9.59	14	38.7	11
26.1	34.31	16	58.9	22	49.67	62	45.1	22	26.26	9	43.3	0	9.47	12	37.2	15
Oct. 6.1	34.19	12	56.3	26	49.22	45	42.6	25	26.21	5	43.5	2	9.39	8	35.3	19
16.0	34.11	8	53.4	29	48.96	26	39.8	28	26.20	1	44.0	5	9.34	5	33.1	[illegible]
26.0	34.08	3	50.3	31	48.91	5	36.9	29	26.23	3	44.7	7	9.34	0	30.7	[illegible]
Nov. 5.0	34.12	4	46.9	34	49.08	17	34.0	29	26.30	7	45.6	9	9.39	5	28.0	[illegible]
15.0	34.22	10	43.4	35	49.48	40	31.3	27	26.42	12	46.7	11	9.49	10	25.1	[illegible]
24.9	34.38	16	39.8	36	50.10	62	28.8	25	26.60	18	48.0	13	9.64	15	22.1	[illegible]
Dec. 4.9	34.60	22	36.3	35	50.92	82	26.6	22	26.82	22	49.6	16	9.85	21	19.1	[illegible]
14.9	34.88	28	32.9	34	51.92	100	24.9	17	27.08	26	51.3	17	10.10	25	16.1	[illegible]
24.8	35.21	33	29.7	32	53.06	114	23.6	13	27.37	29	53.2	19	10.39	29	13.2	[illegible]
34.8	35.57	36	26.8	29	54.31	125	22.9	7	27.68	31	55.1	19	10.71	32	10.5	[illegible]
Sec δ, Tan δ	1.409		+0.992		5.092		−4.993		1.004		−0.092		1.127		+0.519	
Mean Place	$33^{s}.798$		$61''.74$		$52^{s}.505$		$19''.78$		$25^{s}.257$		$34''.00$		$8^{s}.633$		$40''.95$	
$D'_{\psi}\alpha$, $D_{\omega}\alpha$	−0.02		+0.05		+0.08		−0.26		0.00		0.00		−0.01		+0.03	
$D_{\psi}\delta$, $D_{\omega}\delta$	−0.3		−0.6		−0.3		−0.6		−0.3		−0.6		−0.3		−0.6	

FOR THE UPPER TRANSIT AT WASHINGTON.

Solar Date.	109 Virginis. Mag. 3.8				8 Libræ. Mag. 5.3				α Libræ. Mag. 2.9				Groombridge 2164. Mag. 5.7			
	Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination S.		Right Ascension.		Declination N.	
	h m 14 41		° ′ + 2 15		h m 14 45		° ′ −15 37		.h m 14 45		° ′ −15 40		h m 14 49		° ′ +59 38	
	s		″		s		″		s		″		s		″	
0.8	46.80		42.8		47.65		54.1		59.09		35.4		11.26		46.3	
10.8	47.11	31	40.6	22	47.98	33	55.8	17	59.43	34	37.0	16	11.73	47	43.7	26
20.8	47.44	33	38.6	20	48.32	34	57.5	17	59.77	34	38.7	17	12.23	50	41.6	21
30.8	47.77	33	36.8	18	48.67	35	59.2	17	60.11	34	40.4	17	12.75	52	40.1	15
b. 9.7	48.09	32	35.2	16	49.01	34	60.9	17	60.45	34	42.1	17	13.27	52	39.3	8
19.7	48.40	31	33.8	14	49.33	32	62.5	16	60.77	32	43.7	16	13.78	51	39.1	2
29.7	48.69	29	32.8	10	49.63	30	64.0	15	61.07	30	45.2	15	14.25	47	39.6	5
r.10.6	48.95	26	32.1	7	49.90	27	65.3	13	61.34	27	46.5	13	14.68	43	40.8	12
20.6	49.18	23	31.8	3	50.14	24	66.4	11	61.59	25	47.6	11	15.06	38	42.4	16
30.6	49.38	20	31.7	1	50.36	22	67.4	10	61.81	22	48.6	10	15.37	31	44.5	21
r. 9.6	49.55	17	31.8	1	50.55	19	68.2	8	62.00	19	49.4	8	15.62	25	47.1	26
19.5	49.70	15	32.2	4	50.71	16	68.8	6	62.15	15	50.0	6	15.80	18	49.9	28
29.5	49.81	11	32.8	6	50.84	13	69.3	5	62.28	13	50.5	5	15.90	10	52.9	30
y 9.5	49.89	8	33.6	8	50.94	10	69.6	3	62.38	10	50.8	3	15.94	4	55.9	30
19.5	49.95	6	34.4	8	51.01	7	69.8	2	62.45	7	51.0	2	15.91	3	58.8	29
29.4	49.98	3	35.3	9	51.05	4	69.8	0	62.49	4	51.1	1	15.81	10	61.6	28
ne 8.4	49.98	0	36.2	9	51.06	1	69.8	0	62.50	1	51.1	0	15.66	15	64.2	26
18.4	49.96	2	37.0	8	51.05	1	69.7	1	62.49	1	51.0	1	15.45	21	66.4	22
28.3	49.91	5	37.8	8	51.01	4	69.5	2	62.45	4	50.8	2	15.20	25	68.2	18
ly 8.3	49.84	7	38.6	8	50.94	7	69.3	2	62.38	7	50.5	3	14.90	30	69.6	14
18.3	49.75	9	39.3	7	50.85	9	69.0	3	62.29	9	50.2	3	14.58	32	70.5	9
28.3	49.64	11	39.8	5	50.74	11	68.7	3	62.18	11	49.9	3	14.23	35	70.9	4
ug. 7.2	49.52	12	40.2	4	50.62	12	68.3	4	62.06	12	49.5	4	13.87	36	70.8	1
17.2	49.39	13	40.5	3	50.49	13	67.8	5	61.93	13	49.0	5	13.50	37	70.2	6
27.2	49.26	13	40.6	1	50.35	14	67.3	5	61.79	14	48.6	4	13.13	37	69.1	11
pt. 6.2	49.14	12	40.6	0	50.22	13	66.9	4	61.66	13	48.1	5	12.78	35	67.5	16
16.1	49.03	11	40.4	2	50.10	12	66.5	4	61.55	11	47.7	4	12.46	32	65.5	20
26.1	48.94	9	40.0	4	50.01	9	66.1	4	61.46	9	47.3	4	12.18	28	63.0	25
ct. 6.1	48.87	7	39.4	6	49.95	6	65.8	3	61.39	7	47.0	3	11.95	23	60.1	29
16.0	48.85	2	38.5	9	49.93	2	65.6	2	61.36	3	46.9	1	11.78	17	56.9	32
26.0	48.87	2	37.4	11	49.95	2	65.6	0	61.38	2	46.9	0	11.68	10	53.4	35
ov. 5.0	48.94	7	36.0	14	50.02	7	65.8	2	61.46	8	47.1	2	11.65	3	49.7	37
15.0	49.06	12	34.4	16	50.14	12	66.3	5	61.59	13	47.6	5	11.71	6	45.9	38
24.9	49.22	16	32.6	18	50.32	18	67.0	7	61.77	18	48.3	7	11.85	14	42.0	39
c. 4.9	49.43	21	30.7	19	50.54	22	67.9	9	61.99	22	49.2	9	12.08	23	38.2	38
14.9	49.68	25	28.7	20	50.81	27	69.1	12	62.25	26	50.4	12	12.38	30	34.6	36
24.9	49.96	28	26.6	21	51.11	30	70.5	14	62.55	30	51.7	13	12.76	38	31.3	33
34.8	50.27	31	24.4	22	51.43	32	72.0	15	62.87	32	53.3	16	13.19	43	28.4	29
δ, Tan δ	1.001		+0.040		1.039		−0.279		1.039		−0.281		1.979		+1.708	
n Place	47ˢ.931		47″.58		48ˢ.995		54″.59		60ˢ.439		35″.80		12ˢ.324		64″.74	
a, Dw a	0.00		0.00		0.00		−0.01		0.00		−0.01		−0.03		+0.08	
, Dw δ	−0.3		−0.6		−0.3		−0.7		−0.3		−0.7		−0.3		−0.7	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	**β Ursæ Minoris.** Mag. 2.2				**ξ² Libræ.** Mag. 5.6				**Piazzi 221.** Mag. 5.8				**β Lupi.** Mag. 2.8			
	Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination S.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	14 50		+74 30		14 51		−11 3		14 52		+14 47		14 52		−42 46	
	s		″		s		″		s		″		s		″	
Jan. 0.8	55.64		34.7		58.11		19.4		2.85		56.4		43.66		41.4	
10.8	56.40	76	32.2	25	58.44	33	21.2	18	3.16	31	54.0	24	44.08	42	42.0	6
20.8	57.24	84	30.3	19	58.77	33	23.0	18	3.49	33	51.8	22	44.51	43	43.0	10
30.8	58.12	88	29.0	13	59.10	33	24.7	17	3.82	33	50.0	18	44.94	43	44.3	13
Feb. 9.7	59.01	89	28.4	6	59.43	33	26.3	16	4.15	33	48.5	15	45.36	42	45.8	15
19.7	59.88	87	28.5	1	59.75	32	27.8	15	4.46	31	47.4	11	45.76	40	47.5	17
29.7	60.71	83	29.3	8	60.05	30	29.2	14	4.76	30	46.7	7	46.14	38	49.4	19
Mar. 10.7	61.46	75	30.7	14	60.33	28	30.4	12	5.03	27	46.4	3	46.50	36	51.4	20
20.6	62.11	65	32.6	19	60.58	25	31.3	9	5.27	24	46.6	2	46.82	32	53.5	21
30.6	62.65	54	35.0	24	60.79	21	32.0	7	5.48	21	47.1	5	47.10	28	55.6	21
Apr. 9.6	63.06	41	37.8	28	60.97	18	32.5	5	5.66	18	47.9	8	47.34	24	57.7	21
19.5	63.32	26	40.8	30	61.13	16	32.8	3	5.81	15	49.0	11	47.55	21	59.7	20
29.5	63.44	12	43.9	31	61.27	14	33.0	2	5.93	12	50.3	13	47.72	17	61.7	20
May 9.5	63.42	2	47.0	31	61.38	11	33.1	1	6.01	8	51.8	15	47.85	13	63.6	19
19.5	63.26	16	50.0	30	61.46	8	33.0	1	6.07	6	53.3	15	47.94	9	65.3	17
29.4	62.97	29	52.8	28	61.50	4	32.8	2	6.10	3	54.8	15	47.99	5	66.9	16
June 8.4	62.57	40	55.3	25	61.51	1	32.5	3	6.10	0	56.2	14	48.00	1	68.3	14
18.4	62.07	50	57.4	21	61.50	1	32.2	3	6.07	3	57.6	14	47.97	3	69.5	12
28.4	61.48	59	59.1	17	61.46	4	31.8	4	6.01	6	58.9	13	47.90	7	70.5	10
July 8.3	60.81	67	60.4	13	61.40	6	31.4	4	5.93	8	60.0	11	47.80	10	71.2	7
18.3	60.09	72	61.2	8	61.32	8	31.0	4	5.83	10	60.9	9	47.67	13	71.6	4
28.3	59.33	76	61.4	2	61.21	11	30.6	4	5.71	12	61.5	6	47.51	16	71.8	2
Aug. 7.2	58.55	78	61.1	3	61.09	12	30.2	4	5.58	13	61.9	4	47.33	18	71.7	1
17.2	57.77	78	60.2	9	60.96	13	29.8	4	5.44	14	62.0	1	47.14	19	71.3	4
27.2	57.00	77	58.8	14	60.83	13	29.4	4	5.30	14	61.9	1	46.94	20	70.6	7
Sept. 6.2	56.27	73	56.9	19	60.70	13	29.1	3	5.16	14	61.5	4	46.75	19	69.6	10
16.1	55.59	68	54.6	23	60.58	12	28.8	3	5.03	13	60.8	7	46.58	17	68.4	12
26.1	54.98	61	51.9	27	60.48	10	28.6	2	4.92	11	59.9	9	46.44	14	67.0	14
Oct. 6.1	54.47	51	48.8	31	60.42	6	28.6	0	4.84	8	58.7	12	46.35	9	65.5	15
16.1	54.07	40	45.4	34	60.39	3	28.7	1	4.80	4	57.2	15	46.30	5	64.0	15
26.0	53.79	28	41.7	37	60.41	2	29.0	3	4.80	0	55.5	17	46.31	1	62.5	15
Nov. 5.0	53.64	15	37.9	38	60.48	7	29.5	5	4.85	5	53.5	20	46.39	8	61.1	14
15.0	53.64	0	34.0	39	60.59	11	30.2	7	4.95	10	51.2	23	46.53	14	59.9	12
24.9	53.80	16	30.1	39	60.75	16	31.2	10	5.10	15	48.8	24	46.74	21	58.9	10
Dec. 4.9	54.11	31	26.3	38	60.96	21	32.4	12	5.29	19	46.3	25	47.01	27	58.2	7
14.9	54.56	45	22.7	36	61.21	25	33.8	14	5.53	24	43.7	26	47.33	32	57.9	3
24.9	55.14	58	19.5	32	61.50	29	35.3	15	5.80	27	41.1	26	47.70	37	58.0	1
34.8	55.84	70	16.7	28	61.82	32	36.9	16	6.11	31	38.6	25	48.11	41	58.4	4
Sec δ, Tan δ	3.745		+3.609		1.019		−0.195		1.034		+0.264		1.362		−0.925	
Mean Place	57ˢ.086		54″.42		59ˢ.428		18″.25		3ˢ.945		65″.13		45ˢ.614		48″.71	
D′ψ α, Dω α	−0.06		+0.18		0.00		−0.01		0.00		+0.01		+0.02		−0.04	
Dψ δ, Dω δ	−0.3		−0.7		−0.3		−0.7		−0.3		−0.7		−0.3		−0.7	

FOR THE UPPER TRANSIT AT WASHINGTON.

n Solar Date.	δ Libræ. Var. 4.8–6.2				β Boötis. Mag. 3.6				γ Scorpii. Mag. 3.4				ψ Boötis. Mag. 4.7			
	Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination N.	
	h m 14 56		° ′ − 8 10		h m 14 58		° ′ +40 43		h m 14 58		° ′ −24 56		h m 15 0		° ′ +27 16	
	s		″		s		″		s		″		s		″	
n. 0.8	14.78		15.3		36.82		58.7		53.43		9.4		39.39		72.8	
10.8	15.10	32	17.1	18	37.17	35	56.0	27	53.78	35	10.6	12	39.71	32	70.2	26
20.8	15.44	34	18.9	18	37.54	37	53.7	23	54.14	36	12.0	14	40.05	34	67.9	23
30.8	15.77	33	20.6	17	37.92	38	51.9	18	54.50	36	13.5	15	40.40	35	66.0	19
b. 9.7	16.09	32	22.3	17	38.30	38	50.6	13	54.86	36	15.1	16	40.74	34	64.6	14
19.7	16.40	31	23.8	15	38.67	37	50.0	6	55.20	34	16.7	16	41.07	33	63.7	9
29.7	16.70	30	25.0	12	39.02	35	50.0	0	55.52	32	18.3	16	41.38	31	63.3	4
ar.10.7	16.98	28	26.0	10	39.34	32	50.5	5	55.82	30	19.9	16	41.66	28	63.4	1
20.6	17.23	25	26.8	8	39.63	29	51.6	11	56.09	27	21.3	14	41.92	26	64.0	6
30.6	17.45	22	27.4	6	39.88	25	53.2	16	56.33	24	22.6	13	42.15	23	65.0	10
pr. 9.6	17.64	19	27.8	4	40.09	21	55.1	19	56.54	21	23.8	12	42.35	20	66.4	14
19.5	17.80	16	28.0	2	40.25	16	57.3	22	56.72	18	24.9	11	42.51	16	68.1	17
29.5	17.93	13	28.0	0	40.37	12	59.8	25	56.87	15	25.9	10	42.63	12	70.0	19
lay 9.5	18.03	10	27.8	2	40.45	8	62.4	26	56.99	12	26.7	8	42.72	9	72.1	21
19.5	18.11	8	27.5	3	40.48	3	65.0	26	57.08	9	27.4	7	42.77	5	74.2	21
29.4	18.16	5	27.1	4	40.47	1	67.5	25	57.14	6	28.0	6	42.79	2	76.3	21
une 8.4	18.18	2	26.7	4	40.42	5	69.8	23	57.17	3	28.5	5	42.78	1	78.3	20
18.4	18.17	1	26.3	4	40.34	8	71.9	21	57.16	1	28.9	4	42.73	5	80.1	18
28.4	18.13	4	25.8	5	40.22	12	73.7	18	57.12	4	29.1	2	42.66	7	81.7	16
uly 8.3	18.07	6	25.3	5	40.08	14	75.2	15	57.05	7	29.2	1	42.56	10	83.1	14
18.3	17.99	8	24.8	5	39.91	17	76.3	11	56.96	9	29.2	0	42.44	12	84.2	11
28.3	17.89	10	24.4	4	39.72	19	77.0	7	56.85	11	29.0	2	42.30	14	84.9	7
ug. 7.2	17.77	12	24.0	4	39.51	21	77.2	2	56.72	13	28.7	3	42.14	16	85.3	4
17.2	17.64	13	23.6	4	39.30	21	77.0	2	56.58	14	28.3	4	41.97	17	85.3	0
27.2	17.51	13	23.3	3	39.08	22	76.4	6	56.43	15	27.7	6	41.80	17	85.0	3
pt. 6.2	17.38	13	23.0	3	38.87	21	75.4	10	56.29	14	27.1	6	41.64	16	84.3	7
16.1	17.26	12	22.8	2	38.68	19	74.0	14	56.16	13	26.4	7	41.49	15	83.3	10
26.1	17.16	10	22.7	1	38.51	17	72.1	19	56.05	11	25.7	7	41.35	14	81.9	14
t. 6.1	17.09	7	22.8	1	38.37	14	69.8	23	55.97	8	25.0	7	41.24	11	80.2	17
16.1	17.06	3	23.1	3	38.27	10	67.2	26	55.93	4	24.3	7	41.17	7	78.1	21
26.0	17.07	1	23.6	5	38.22	5	64.3	29	55.94	1	23.8	5	41.15	2	75.7	24
ov. 5.0	17.13	6	24.3	7	38.23	1	61.1	32	56.00	6	23.5	3	41.18	3	73.1	26
15.0	17.24	11	25.2	9	38.30	7	57.8	33	56.12	12	23.3	2	41.26	8	70.3	28
24.9	17.40	16	26.3	11	38.43	13	54.3	35	56.29	17	23.4	1	41.39	13	67.3	30
c. 4.9	17.60	20	27.6	13	38.62	19	50.8	35	56.51	22	23.7	3	41.57	18	64.2	31
14.9	17.84	24	29.1	15	38.87	25	47.4	34	56.78	27	24.3	6	41.80	23	61.2	30
24.9	18.12	28	30.8	17	39.16	29	44.2	32	57.09	31	25.2	9	42.07	27	58.3	29
34.8	18.44	32	32.5	17	39.49	33	41.2	30	57.43	34	26.3	11	42.38	31	55.5	28
, Tan δ	1.010		−0.144		1.320		+0.861		1.103		−0.465		1.125		+0.516	
n Place	16ˢ.088		13″.08		37ˢ.882		73″.91		54ˢ.988		11″.79		40ˢ.483		84″.93	
, $D_\omega \alpha$	0.00		−0.01		−0.02		+0.04		+0.1		−0.02		−0.01		+0.02	
, $D_\omega \delta$	−0.3		−0.7		−0.3		−0.7		−0.3		−0.7		−0.3		−0.7	

Mean Solar Date.	c Boötis. Mag. 5.0				ζ Lupi. Mag. 3.5				ι Libræ. Mag. 4.7				γ Triang. Aust. Mag. 3.1			
	Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination S.		Right Ascension.		Declination S.	
	h m		° '		h m		° '		h m		° '		h m		° '	
	15 3		+25 12		15 5		−51 45		15 7		−19 27		15 10		−68 21	
	s		"		s		"		s		"		s		"	
Jan. 0.9	25.04		29.1		54.96		45.0		10.62		33.2		36.63		8.9	
10.8	25.36	32	26.5	26	55.43	47	45.2	2	10.96	34	34.6	14	37.35	72	8.4	5
20.8	25.69	33	24.2	23	55.92	49	45.8	6	11.30	34	36.1	15	38.10	75	8.4	0
30.8	26.03	34	22.3	19	56.41	49	46.7	9	11.65	35	37.7	16	38.87	77	8.9	5
Feb. 9.7	26.37	34	20.9	14	56.90	49	48.0	13	11.99	34	39.2	15	39.64	77	9.9	10
19.7	26.70	33	20.0	9	57.37	47	49.6	16	12.33	34	40.7	15	40.39	75	11.3	14
29.7	27.01	31	19.5	5	57.82	45	51.4	18	12.65	32	42.2	15	41.10	71	13.1	18
Mar. 10.7	27.30	29	19.5	0	58.24	42	53.4	20	12.94	29	43.5	13	41.77	67	15.2	21
20.6	27.56	26	20.0	5	58.63	39	55.6	22	13.20	26	44.7	12	42.39	62	17.6	24
30.6	27.79	23	20.9	9	58.98	35	57.9	23	13.44	24	45.8	11	42.94	55	20.2	26
Apr. 9.6	27.98	19	22.2	13	59.28	30	60.2	23	13.65	21	46.7	9	43.42	48	23.0	28
19.6	28.14	16	23.8	16	59.54	26	62.6	24	13.84	19	47.4	7	43.83	41	26.0	30
29.5	28.27	13	25.6	18	59.75	21	64.9	23	14.00	16	48.0	6	44.16	33	29.0	30
May 9.5	28.36	9	27.6	20	59.91	16	67.2	23	14.12	12	48.5	5	44.40	24	32.0	30
19.5	28.42	6	29.6	20	60.03	12	69.4	22	14.21	9	48.9	4	44.56	16	34.9	29
29.4	28.45	3	31.6	20	60.10	7	71.5	21	14.27	6	49.2	3	44.63	7	37.7	28
June 8.4	28.44	1	33.5	19	60.12	2	73.4	19	14.30	3	49.3	1	44.61	2	40.4	27
18.4	28.40	4	35.3	18	60.08	4	75.1	17	14.30	0	49.4	1	44.50	11	42.8	24
28.4	28.33	7	36.9	16	60.00	8	76.5	14	14.27	3	49.4	0	44.31	19	44.9	21
July 8.3	28.23	10	38.2	13	59.87	13	77.6	11	14.22	5	49.3	1	44.04	27	46.6	17
18.3	28.11	12	39.2	10	59.70	17	78.4	8	14.14	8	49.1	2	43.71	33	47.9	13
28.3	27.98	13	40.0	8	59.50	20	78.9	5	14.03	11	48.9	2	43.32	39	48.8	9
Aug. 7.3	27.83	15	40.5	5	59.28	22	79.0	1	13.90	13	48.6	3	42.89	43	49.3	5
17.2	27.67	16	40.6	1	59.04	24	78.8	2	13.76	14	48.2	4	42.43	46	49.3	0
27.2	27.51	16	40.3	3	58.79	25	78.2	6	13.62	14	47.8	4	41.96	47	48.8	5
Sept. 6.2	27.35	16	39.7	6	58.55	24	77.3	9	13.48	14	47.3	5	41.51	45	47.8	10
16.1	27.20	15	38.7	10	58.33	22	76.0	13	13.35	13	46.8	5	41.09	42	46.4	14
26.1	27.07	13	37.4	13	58.14	19	74.4	16	13.24	11	46.3	5	40.73	36	44.6	18
Oct. 6.1	26.97	10	35.8	16	58.00	14	72.6	18	13.16	8	45.9	4	40.45	28	42.5	21
16.1	26.90	7	33.9	19	57.92	8	70.7	19	13.12	4	45.6	3	40.27	18	40.1	24
26.0	26.87	3	31.7	22	57.91	1	68.8	19	13.12	0	45.4	2	40.20	7	37.6	25
Nov. 5.0	26.90	3	29.2	25	57.97	6	67.0	18	13.17	5	45.3	1	40.24	4	35.0	26
15.0	26.98	8	26.4	28	58.11	14	65.3	17	13.28	11	45.4	1	40.41	17	32.5	25
25.0	27.11	13	23.4	30	58.33	22	63.8	15	13.44	16	45.8	4	40.71	30	30.2	23
Dec. 4.9	27.29	18	20.4	30	58.62	29	62.6	12	13.65	21	46.4	6	41.12	41	28.2	20
14.9	27.52	23	17.5	29	58.97	35	61.7	9	13.90	25	47.3	9	41.64	52	26.5	17
24.9	27.79	27	14.6	29	59.38	41	61.2	5	14.19	29	48.4	11	42.25	61	25.2	13
34.8	28.09	30	11.8	28	59.83	45	61.0	2	14.51	32	49.8	14	42.94	69	24.3	9
Sec δ, Tan δ	1.105		+0.471		1.616		−1.269		1.061		−0.353		2.711		−2.520	
Mean Place	$26^{s}.153$		$40''.79$		$57^{s}.361$		$53''.36$		$12^{s}.122$		$33''.75$		$40^{s}.601$		$19''.54$	
$D'_{\psi}a$, $D_{\omega}a$	−0.01		+0.02		+0.02		−0.06		+0.01		−0.02		+0.05		−0.11	
$D_{\psi}\delta$, $D_{\omega}\delta$	−0.3		−0.7		−0.3		−0.7		−0.3		−0.7		−0.3		−0.7	

FOR THE UPPER TRANSIT AT WASHINGTON.

an Solar Date.	**8 Serpentis.** Mag. 5.4				**δ Boötis.** Mag. 3.5				**β Libræ.** Mag. 2.7				**γ Ursæ Minoris.** Mag. 3.1			
	Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination N.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	15 10		+ 5 15		15 11		+33 38		15 12		− 9 3		15 20		+72 8	
	s		″		s		″		s		″		s		″	
n. 0.9	47.55		49.3		56.16		19.6		14.78		34.3		49.74		30.6	
10.8	47.86	31	47.1	22	56.49	33	16.8	28	15.09	31	36.0	17	50.36	62	27.7	29
20.8	48.18	32	45.1	20	56.83	34	14.4	24	15.42	33	37.7	17	51.06	70	25.4	23
30.8	48.51	33	43.3	18	57.18	35	12.5	19	15.75	33	39.3	16	51.81	75	23.7	17
b. 9.7	48.83	32	41.7	16	57.54	36	11.1	14	16.07	32	40.9	16	52.59	78	22.7	10
19.7	49.14	31	40.4	13	57.89	35	10.2	9	16.39	32	42.4	15	53.37	78	22.4	3
29.7	49.44	30	39.4	10	58.22	33	9.9	3	16.70	31	43.7	13	54.12	75	22.8	4
ar. 10.7	49.72	28	38.8	6	58.53	31	10.1	2	16.99	29	44.7	10	54.82	70	23.8	10
20.6	49.97	25	38.5	3	58.81	28	10.9	8	17.25	26	45.5	8	55.45	63	25.4	16
30.6	50.19	22	38.6	1	59.05	24	12.1	12	17.48	23	46.1	6	55.99	54	27.5	21
r. 9.6	50.39	20	39.0	4	59.26	21	13.7	16	17.68	20	46.4	3	56.43	44	30.0	25
19.6	50.56	17	39.6	6	59.43	17	15.7	20	17.86	18	46.5	1	56.75	32	32.8	28
29.5	50.70	14	40.4	8	59.56	13	17.9	22	18.01	15	46.5	0	56.95	20	35.9	31
ay 9.5	50.81	11	41.4	10	59.66	10	20.2	23	18.13	12	46.4	1	57.03	8	39.1	32
19.5	50.89	8	42.5	11	59.72	6	22.6	24	18.22	9	46.2	2	56.99	4	42.2	31
29.4	50.94	5	43.6	11	59.74	2	24.9	23	18.29	7	45.9	3	56.83	16	45.2	30
ne 8.4	50.96	2	44.7	11	59.73	1	27.2	23	18.33	4	45.5	4	56.56	27	48.0	28
18.4	50.96	0	45.8	11	59.68	5	29.3	21	18.33	0	45.0	5	56.20	36	50.4	24
28.4	50.93	3	46.8	10	59.60	8	31.1	18	18.30	3	44.5	5	55.75	45	52.5	21
ly 8.3	50.87	6	47.7	9	59.49	11	32.6	15	18.25	5	44.0	5	55.22	53	54.2	17
18.3	50.78	9	48.5	8	59.35	14	33.8	12	18.17	8	43.6	4	54.63	59	55.4	12
28.3	50.67	11	49.2	7	59.19	16	34.6	8	18.07	10	43.2	4	53.99	64	56.1	7
g. 7.3	50.55	12	49.7	5	59.01	18	35.0	4	17.96	11	42.8	4	53.31	68	56.3	2
17.2	50.42	13	50.0	3	58.82	19	35.1	1	17.83	13	42.5	3	52.62	69	55.9	4
27.2	50.28	14	50.1	1	58.63	19	34.8	3	17.69	14	42.2	3	51.92	70	55.0	9
pt. 6.2	50.14	14	50.0	1	58.44	19	34.1	7	17.55	14	41.9	3	51.24	68	53.6	14
16.1	50.01	13	49.7	3	58.26	18	32.9	12	17.42	13	41.7	2	50.60	64	51.7	19
26.1	49.90	11	49.2	5	58.10	16	31.3	16	17.31	11	41.6	1	50.01	59	49.3	24
t. 6.1	49.81	9	48.5	7	57.97	13	29.4	19	17.23	8	41.6	0	49.49	52	46.5	28
16.1	49.76	5	47.6	9	57.88	9	27.1	23	17.18	5	41.8	2	49.05	44	43.4	31
26.0	49.75	1	46.4	12	57.83	5	24.5	26	17.17	1	42.2	4	48.72	33	40.0	34
v. 5.0	49.79	4	45.0	14	57.84	1	21.7	28	17.22	5	42.8	6	48.51	21	36.3	37
15.0	49.88	9	43.3	17	57.90	6	18.7	30	17.32	10	43.6	8	48.42	9	32.5	38
25.0	50.01	13	41.4	19	58.02	12	15.5	32	17.46	14	44.6	10	48.47	5	28.6	39
c. 4.9	50.19	18	39.4	20	58.19	17	12.2	33	17.65	19	45.8	12	48.65	18	24.7	39
14.9	50.42	23	37.3	21	58.41	22	9.0	32	17.89	24	47.2	14	48.96	31	21.0	37
24.9	50.68	26	35.1	22	58.68	27	5.9	31	18.16	27	48.8	16	49.40	44	17.6	34
34.8	50.97	29	32.9	22	58.98	30	2.9	30	18.46	30	50.4	16	49.95	55	14.5	31
δ, Tan δ	1.004		+0.092		1.201		+0.665		1.013		−0.160		3.261		+3.104	
n Place	48^{s}.808		55″.83		57^{s}.309		33″.26		16^{s}.169		31″.67		51^{s}.640		49″.56	
a, D_ω a	0.00		0.00		−0.01		+0.03		0.00		−0.01		−0.06		+0.13	
δ, D_ω δ	−0.3		−0.7		−0.3		−0.7		−0.3		−0.7		−0.3		−0.8	

Mean Solar Date.	*μ* Boötis *pr.* Mag. 4.5				*τ*¹ Serpentis. Mag. 5.5				*ρ* Octantis. Mag. 5.7				*ι* Draconis. Mag. 3.5			
	Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination N.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	15 21		+37 40		15 21		+15 43		15 22		−84 10		15 22		+59 15	
	s		″		s		″		s		″		s		″	
Jan. 0.9	8.75	33	52.6	28	41.18	30	63.2	25	35.97	226	16.5	11	56.90	42	68.5	30
10.8	9.08	35	49.8	25	41.48	32	60.7	22	38.23	244	15.4	6	57.32	47	65.5	25
20.8	9.43	36	47.3	20	41.80	32	58.5	19	40.67	254	14.8	1	57.79	49	63.0	18
30.8	9.79	37	45.3	14	42.12	33	56.6	16	43.21	258	14.7	5	58.28	50	61.2	12
Feb. 9.8	10.16	36	43.9	9	42.45	32	55.0	12	45.79	255	15.2	10	58.78	51	60.0	6
19.7	10.52	34	43.0	3	42.77	30	53.8	7	48.34	247	16.2	15	59.29	49	59.4	1
29.7	10.86	32	42.7	3	43.07	28	53.1	3	50.81	234	17.7	20	59.78	46	59.5	8
Mar. 10.7	11.18	29	43.0	9	43.35	26	52.8	1	53.15	217	19.7	23	60.24	41	60.3	13
20.6	11.47	26	43.9	13	43.61	24	52.9	5	55.32	195	22.0	27	60.65	36	61.6	19
30.6	11.73	23	45.2	17	43.85	21	53.4	9	57.27	170	24.7	30	61.01	30	63.5	24
Apr. 9.6	11.96	19	46.9	21	44.06	18	54.3	12	58.97	142	27.7	32	61.31	23	65.9	27
19.6	12.15	14	49.0	24	44.24	15	55.5	14	60.39	112	30.9	33	61.54	16	68.6	29
29.5	12.29	10	51.4	25	44.39	11	56.9	15	61.51	80	34.2	34	61.70	10	71.5	30
May 9.5	12.39	6	53.9	25	44.50	8	58.4	16	62.31	46	37.6	35	61.80	2	74.5	31
19.5	12.45	2	56.4	25	44.58	5	60.0	17	62.77	12	41.1	33	61.82	4	77.6	30
29.5	12.47	1	58.9	24	44.63	2	61.7	16	62.89	22	44.4	32	61.78	10	80.6	28
June 8.4	12.46	5	61.3	22	44.65	1	63.3	15	62.67	56	47.6	30	61.68	16	83.4	25
18.4	12.41	9	63.5	20	44.64	4	64.8	14	62.11	88	50.6	27	61.52	22	85.9	21
28.4	12.32	12	65.5	17	44.60	7	66.2	13	61.23	117	53.3	23	61.30	26	88.0	18
July 8.3	12.20	15	67.2	13	44.53	9	67.5	11	60.06	141	55.6	19	61.04	31	89.8	14
18.3	12.05	17	68.5	9	44.44	11	68.6	8	58.65	162	57.5	14	60.73	34	91.2	9
28.3	11.88	19	69.4	5	44.33	13	69.4	5	57.03	178	58.9	9	60.39	36	92.1	3
Aug. 7.3	11.69	21	69.9	1	44.20	15	69.9	3	55.25	188	59.8	3	60.03	38	92.4	2
17.2	11.48	21	70.0	3	44.05	15	70.2	0	53.37	190	60.1	2	59.65	38	92.2	7
27.2	11.27	21	69.7	7	43.90	15	70.2	3	51.47	185	59.9	8	59.27	38	91.5	12
Sept. 6.2	11.06	20	69.0	12	43.75	15	69.9	6	49.62	172	59.1	13	58.89	36	90.3	16
16.2	10.86	18	67.8	16	43.60	13	69.3	8	47.90	152	57.8	18	58.53	33	88.7	21
26.1	10.68	15	66.2	20	43.47	10	68.5	11	46.38	126	56.0	23	58.20	28	86.6	25
Oct. 6.1	10.53	11	64.2	24	43.37	7	67.4	14	45.12	94	53.7	26	57.92	23	84.1	29
16.1	10.42	7	61.8	27	43.30	3	66.0	17	44.18	56	51.1	29	57.69	17	81.2	33
26.0	10.35	2	59.1	29	43.27	1	64.3	20	43.62	14	48.2	30	57.52	9	77.9	36
Nov. 5.0	10.33	4	56.2	31	43.28	6	62.3	22	43.48	29	45.2	30	57.43	1	74.3	37
15.0	10.37	10	53.1	33	43.34	12	60.1	24	43.77	72	42.2	29	57.42	7	70.6	38
25.0	10.47	16	49.8	34	43.46	17	57.7	25	44.49	114	39.3	27	57.49	16	66.8	38
Dec. 4.9	10.63	22	46.4	34	43.63	21	55.2	26	45.63	152	36.6	24	57.65	24	63.0	37
14.9	10.85	26	43.0	33	43.84	25	52.6	26	47.15	185	34.2	20	57.89	32	59.3	35
24.9	11.11	30	39.7	30	44.09	29	50.0	26	49.00	214	32.2	15	58.21	38	55.8	32
34.9	11.41		36.7		44.38		47.4		51.14		30.7		58.59		52.6	
Sec δ, Tan δ	1.264		+0.772		1.039		+0.282		9.857		−9.806		1.957		+1.682	
Mean Place	$9^{s}.964$		67″.11		$42^{s}.423$		72″.69		$49^{s}.95$		27″.50		$58^{s}.326$		86″.33	
$D'_{\psi}\,a$, $D_{\omega}\,a$	−0.02		+0.03		−0.01		+0.01		+0.20		−0.41		−0.03		+0.07	
$D_{\psi}\,\delta$, $D_{\omega}\,\delta$	−0.3		−0.8		−0.3		−0.8		−0.3		−0.8		−0.3		−0.8	

FOR THE UPPER TRANSIT AT WASHINGTON.

an Solar Date.	ζ^1 **Libræ.** Mag. 5.9				β **Coronæ Borealis.** Mag. 3.7				ν^1 **Boötis.** Mag. 5.2				γ **Lupi** (*mean*). Mag. 3.0			
	Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination S.	
	h m 15 23		° ′ −16 24		h m 15 24		° ′ +29 24		h m 15 27		° ′ +41 7		h m 15 29		° ′ −40 52	
	s		″		s		″		s		″		s		″	
n. 0.9	15.93		38.3		10.83		17.9		44.84		42.1		14.22		14.1	
10.8	16.25	32	39.7	14	11.14	31	15.2	27	45.17	33	39.1	30	14.61	39	14.5	4
20.8	16.58	33	41.2	15	11.47	33	12.8	24	45.52	35	36.6	25	15.02	41	15.2	7
30.8	16.92	34	42.7	15	11.81	34	10.8	20	45.89	37	34.6	20	15.43	41	16.1	9
b. 9.8	17.26	34	44.2	15	12.15	34	9.2	16	46.27	38	33.1	15	15.85	42	17.2	11
19.7	17.59	33	45.6	14	12.49	34	8.2	10	46.65	38	32.2	9	16.26	41	18.5	13
29.7	17.91	32	46.9	13	12.82	33	7.7	5	47.01	36	31.9	3	16.65	39	20.0	15
ar. 10.7	18.21	30	48.0	11	13.13	31	7.8	1	47.35	34	32.3	4	17.02	37	21.6	16
20.6	18.49	28	49.0	10	13.41	28	8.4	6	47.66	31	33.2	9	17.36	34	23.3	17
30.6	18.74	25	49.9	9	13.65	24	9.4	10	47.93	27	34.6	14	17.67	31	25.1	18
r. 9.6	18.96	22	50.6	7	13.86	21	10.8	14	48.16	23	36.4	18	17.95	28	26.9	18
19.6	19.15	19	51.2	6	14.04	18	12.6	18	48.36	20	38.6	22	18.20	25	28.6	17
29.5	19.31	16	51.6	4	14.19	15	14.6	20	48.52	16	41.0	24	18.42	22	30.2	16
ay 9.5	19.45	14	51.8	2	14.30	11	16.8	22	48.63	11	43.6	26	18.60	18	31.8	16
19.5	19.56	11	51.9	1	14.37	7	19.1	23	48.70	7	46.3	27	18.74	14	33.4	16
29.5	19.64	8	52.0	1	14.41	4	21.3	22	48.72	2	49.0	27	18.84	10	34.9	15
ne 8.4	19.69	5	52.0	0	14.42	1	23.5	22	48.70	2	51.6	26	18.90	6	36.3	14
18.4	19.71	2	51.9	1	14.39	3	25.5	20	48.64	6	54.0	24	18.91	1	37.5	12
28.4	19.70	1	51.8	1	14.32	7	27.3	18	48.55	9	56.1	21	18.88	3	38.5	10
ly 8.3	19.65	5	51.6	2	14.23	9	28.9	16	48.42	13	57.8	17	18.81	7	39.3	8
18.3	19.57	8	51.4	2	14.11	12	30.2	13	48.26	16	59.1	13	18.71	10	39.9	6
28.3	19.47	10	51.1	3	13.97	14	31.1	9	48.07	19	60.1	10	18.57	14	40.3	4
g. 7.3	19.35	12	50.8	3	13.81	16	31.7	6	47.86	21	60.7	6	18.40	17	40.4	1
17.2	19.22	13	50.5	3	13.63	18	31.9	2	47.63	23	60.8	1	18.21	19	40.3	1
27.2	19.08	14	50.1	4	13.44	19	31.7	2	47.40	23	60.5	3	18.02	19	39.9	4
pt. 6.2	18.93	15	49.7	4	13.26	18	31.2	5	47.17	23	59.8	7	17.83	19	39.2	7
16.2	18.79	14	49.3	4	13.09	17	30.3	9	46.95	22	58.6	12	17.65	18	38.3	9
26.1	18.67	12	49.0	3	12.93	16	29.0	13	46.75	20	57.0	16	17.49	16	37.2	11
t. 6.1	18.58	9	48.8	2	12.80	13	27.3	17	46.58	17	55.0	20	17.36	13	36.0	12
16.1	18.53	5	48.6	2	12.70	10	25.3	20	46.45	13	52.6	24	17.28	8	34.7	13
26.0	18.52	1	48.5	1	12.65	5	23.0	23	46.37	8	49.8	28	17.25	3	33.3	14
v. 5.0	18.55	3	48.6	1	12.65	0	20.4	26	46.34	3	46.7	31	17.28	3	32.0	13
15.0	18.64	9	48.9	3	12.70	5	17.5	29	46.36	2	43.4	33	17.37	9	30.9	11
25.0	18.78	14	49.4	5	12.80	10	14.4	31	46.45	9	39.9	35	17.53	16	29.9	10
c. 4.9	18.97	19	50.1	7	12.96	16	11.3	31	46.60	15	36.4	35	17.75	22	29.1	8
14.9	19.20	23	51.0	9	13.17	21	8.2	31	46.81	21	33.0	34	18.03	28	28.6	5
24.9	19.47	27	52.2	12	13.42	25	5.2	30	47.07	26	29.7	33	18.36	33	28.4	2
34.9	19.78	31	53.6	14	13.71	29	2.3	29	47.38	31	26.5	32	18.74	38	28.6	2
δ, Tan δ	1.042		−0.294		1.148		+0.562		1.328		+0.873		1.323		−0.865	
n Place	$17^{s}.460$		$37''.21$		$12^{s}.054$		$30''.67$		$46^{s}.106$		$57''.17$		$16^{s}.296$		$18''.57$	
α, $D_{\omega}\alpha$	+0.01		−0.01		−0.01		+0.02		−0.02		+0.04		+0.02		−0.04	
, $D_{\omega}\delta$	−0.3		−0.8		−0.3		−0.8		−0.2		−0.8		−0.2		−0.8	

Mean Solar Date.	*γ* **Libræ.** Mag. 4.0				*α* **Coronæ Borealis.** Mag. 2.3				*ζ* **Cor. Bor.** *seq.* Mag. 5.1				*α* **Serpentis.** Mag. 2.8			
	Right Ascension.		**Declination S.**		**Right Ascension.**		**Declination N.**		**Right Ascension.**		**Declination N.**		**Right Ascension.**		**Declination N.**	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	15 30		−14 29		15 30		+27 0		15 36		+36 54		15 39		+ 6 41	
	s		″		s		″		s		″		s		″	
Jan. 0.9	34.56		49.5		56.43		24.7		2.55		61.4		54.56		59.1	
10.8	34.87	31	51.0	15	56.73	30	22.0	27	2.86	31	58.5	29	54.85	29	56.9	22
20.8	35.20	33	52.5	15	57.05	32	19.6	24	3.20	34	55.9	26	55.16	31	54.9	20
30.8	35.54	34	54.0	15	57.39	34	17.5	21	3.55	35	53.8	21	55.48	32	53.1	18
Feb. 9.8	35.88	34	55.4	14	57.73	34	15.9	16	3.92	37	52.3	15	55.80	32	51.5	16
19.7	36.21	33	56.8	14	58.07	34	14.8	11	4.28	36	51.3	10	56.11	31	50.2	13
29.7	36.52	31	58.0	12	58.39	32	14.2	6	4.62	34	50.8	5	56.42	31	49.2	10
Mar. 10.7	36.82	30	59.1	11	58.69	30	14.2	0	4.95	33	50.9	1	56.71	29	48.7	5
20.7	37.10	28	60.0	9	58.97	28	14.7	5	5.25	30	51.7	8	56.98	27	48.5	2
30.6	37.35	25	60.7	7	59.22	25	15.6	9	5.52	27	53.0	13	57.22	24	48.6	1
Apr. 9.6	37.58	23	61.3	6	59.44	22	16.9	13	5.76	24	54.6	16	57.44	22	49.1	5
19.6	37.78	20	61.7	4	59.63	19	18.6	17	5.96	20	56.6	20	57.63	19	49.8	7
29.5	37.95	17	61.9	2	59.78	15	20.5	19	6.12	16	59.0	24	57.80	17	50.8	10
May 9.5	38.09	14	62.0	1	59.90	12	22.6	21	6.24	12	61.5	25	57.94	14	51.9	11
19.5	38.21	12	62.1	1	59.98	8	24.8	22	6.32	8	64.1	26	58.04	10	53.1	12
29.5	38.29	8	62.0	1	60.03	5	27.0	22	6.36	4	66.6	25	58.12	8	54.4	13
June 8.4	38.34	5	61.9	1	60.05	2	29.1	21	6.36	0	69.0	24	58.17	5	55.7	13
18.4	38.36	2	61.7	2	60.03	2	31.1	20	6.32	4	71.3	23	58.19	2	56.9	12
28.4	38.35	1	61.5	2	59.97	6	32.9	18	6.25	7	73.4	21	58.17	2	58.1	12
July 8.4	38.31	4	61.3	2	59.89	8	34.4	15	6.14	11	75.2	18	58.13	4	59.1	10
18.3	38.24	7	61.0	3	59.78	11	35.7	13	6.00	14	76.6	14	58.06	7	60.0	9
28.3	38.15	9	60.7	3	59.65	13	36.6	9	5.83	17	77.7	11	57.96	10	60.8	8
Aug. 7.3	38.03	12	60.3	4	59.49	16	37.3	7	5.64	19	78.4	7	57.84	12	61.4	6
17.2	37.90	13	60.0	3	59.32	17	37.6	3	5.44	20	78.7	3	57.70	14	61.8	4
27.2	37.76	14	59.7	3	59.14	18	37.5	1	5.22	22	78.5	2	57.55	15	62.0	2
Sept. 6.2	37.61	15	59.3	4	58.96	18	37.0	5	5.00	22	77.9	6	57.40	15	62.0	0
16.2	37.47	14	59.0	3	58.79	17	36.2	8	4.80	20	76.9	10	57.26	14	61.8	2
26.1	37.35	12	58.8	2	58.64	15	35.0	12	4.62	18	75.4	15	57.13	13	61.3	5
Oct. 6.1	37.25	10	58.6	2	58.51	13	33.5	15	4.46	16	73.6	18	57.02	11	60.6	7
16.1	37.19	6	58.5	1	58.41	10	31.6	19	4.33	13	71.4	22	56.95	7	59.6	10
26.1	37.17	2	58.6	1	58.36	5	29.4	22	4.24	9	68.8	26	56.91	4	58.4	12
Nov. 5.0	37.20	3	58.8	2	58.35	1	26.9	25	4.21	3	66.0	28	56.92	1	57.0	14
15.0	37.28	8	59.2	4	58.39	4	24.2	27	4.24	3	62.9	31	56.98	6	55.3	17
25.0	37.41	13	59.8	6	58.49	10	21.3	29	4.32	8	59.6	33	57.08	10	53.4	19
Dec. 4.9	37.59	18	60.6	8	58.64	15	18.3	30	4.46	14	56.2	34	57.23	15	51.4	20
14.9	37.81	22	61.6	10	58.84	20	15.2	31	4.65	19	52.8	34	57.43	20	49.3	21
24.9	38.08	27	62.8	12	59.09	25	12.2	30	4.90	25	49.6	32	57.67	24	47.1	22
34.9	38.38	30	64.2	14	59.37	28	9.4	28	5.19	29	46.5	31	57.94	27	44.9	22
Sec δ, Tan δ	1.033		−0.259		1.122		+0.510		1.251		+0.752		1.007		+0.117	
Mean Place	$36^{\mathrm{s}}.095$		47″.58		$57^{\mathrm{s}}.695$		36″.95		$3^{\mathrm{s}}.854$		75″.64		$55^{\mathrm{s}}.937$		66″.75	
$D'_{\psi}\alpha$, $D_{\omega}\alpha$	+0.01		−0.01		−0.01		+0.02		−0.02		+0.03		0.00		0.00	
$D_{\psi}\delta$, $D_{\omega}\delta$	−0.2		−0.8		−0.2		−0.8		−0.2		−0.8		−0.2		−0.8	

FOR THE UPPER TRANSIT AT WASHINGTON.

ean Solar Date.	β Serpentis. Mag. 3.7				κ Serpentis. Mag. 4.3				μ Serpentis. Mag. 3.6				12 H. Draconis. Mag. 5.1			
	Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination N.	
	h m 15 42		° ′ +15 41		h m 15 44		° ′ +18 24		h m 15 45		° ′ − 3 9		h m 15 45		° ′ +62 51	
	s		″		s		″		s		″		s		″	
n. 0.9	6.22		37.8		45.32		35.1		0.09		47.0		17.56		58.9	
10.9	6.50	28	35.4	24	45.60	28	32.6	25	0.38	29	48.8	18	17.98	42	55.8	31
20.8	6.81	31	33.1	23	45.91	31	30.3	23	0.69	31	50.6	18	18.45	47	53.2	26
30.8	7.13	32	31.1	20	46.23	32	28.2	21	1.01	32	52.2	16	18.97	52	51.1	21
b. 9.8	7.46	33	29.5	16	46.56	33	26.6	16	1.34	33	53.7	15	19.52	55	49.6	15
19.7	7.78	32	28.3	12	46.88	32	25.4	12	1.66	32	55.0	13	20.07	55	48.8	8
29.7	8.09	31	27.5	8	47.19	31	24.6	8	1.97	31	56.1	11	20.61	54	48.7	1
ar. 10.7	8.38	29	27.1	4	47.49	30	24.3	3	2.26	29	56.9	8	21.13	52	49.3	6
20.7	8.65	27	27.2	1	47.76	27	24.4	1	2.53	27	57.4	5	21.60	47	50.5	12
30.6	8.90	25	27.7	5	48.01	25	25.0	6	2.78	25	57.6	2	22.02	42	52.3	18
pr. 9.6	9.13	23	28.5	8	48.24	23	26.0	10	3.01	23	57.5	1	22.38	36	54.6	23
19.6	9.32	19	29.7	12	48.43	19	27.3	13	3.21	20	57.3	2	22.67	29	57.2	26
29.6	9.49	17	31.1	14	48.60	17	28.8	15	3.39	18	56.9	4	22.88	21	60.1	29
ay 9.5	9.62	13	32.6	15	48.74	14	30.5	17	3.54	15	56.4	5	23.02	14	63.2	31
19.5	9.73	11	34.3	17	48.84	10	32.3	18	3.66	12	55.7	7	23.08	6	66.3	31
29.5	9.80	7	36.1	18	48.91	7	34.2	19	3.75	9	54.9	8	23.06	2	69.4	31
me 8.4	9.84	4	37.8	17	48.95	4	36.0	18	3.80	5	54.1	8	22.96	10	72.4	30
18.4	9.85	1	39.4	16	48.96	1	37.8	18	3.83	3	53.3	8	22.80	16	75.1	27
28.4	9.83	2	40.9	15	48.94	2	39.4	16	3.83	0	52.6	7	22.57	23	77.5	24
ly 8.4	9.78	5	42.2	13	48.88	6	40.8	14	3.79	4	51.9	7	22.28	29	79.5	20
18.3	9.69	9	43.4	12	48.79	9	42.0	12	3.73	6	51.2	7	21.94	34	81.1	16
28.3	9.58	11	44.3	9	48.68	11	43.0	10	3.64	9	50.7	5	21.55	39	82.2	11
ug. 7.3	9.45	13	45.0	7	48.54	14	43.7	7	3.53	11	50.2	5	21.13	42	82.9	7
17.3	9.31	14	45.4	4	48.39	15	44.2	5	3.40	13	49.8	4	20.69	44	83.0	1
27.2	9.15	16	45.5	1	48.23	16	44.3	1	3.25	15	49.6	2	20.24	45	82.6	4
pt. 6.2	8.99	16	45.4	1	48.06	17	44.1	2	3.10	15	49.4	2	19.79	45	81.7	9
16.2	8.84	15	45.0	4	47.90	16	43.6	5	2.96	14	49.4	0	19.35	44	80.3	14
26.1	8.69	15	44.2	8	47.75	15	42.8	8	2.83	13	49.5	1	18.94	41	78.4	19
t. 6.1	8.57	12	43.1	11	47.62	13	41.7	11	2.73	10	49.8	3	18.57	37	76.0	24
16.1	8.48	9	41.8	13	47.53	9	40.2	15	2.66	7	50.3	5	18.26	31	73.2	28
26.1	8.43	5	40.1	17	47.48	5	38.4	18	2.62	4	50.9	6	18.02	24	70.1	31
v. 5.0	8.43	0	38.2	19	47.47	1	36.4	20	2.62	0	51.8	9	17.86	16	66.6	35
15.0	8.47	4	36.1	21	47.50	3	34.1	23	2.68	6	52.9	11	17.78	8	62.9	37
25.0	8.56	9	33.8	23	47.59	9	31.6	25	2.79	11	54.1	12	17.79	1	59.1	38
c. 5.0	8.71	15	31.3	25	47.73	14	29.0	26	2.94	15	55.6	15	17.90	11	55.3	38
14.9	8.90	19	28.7	26	47.92	19	26.3	27	3.14	20	57.2	16	18.11	21	51.5	38
24.9	9.13	23	26.1	26	48.15	23	23.6	27	3.39	25	58.9	17	18.40	29	47.8	37
34.9	9.40	27	23.6	25	48.42	27	21.0	26	3.66	27	60.8	19	18.78	38	44.5	33
J, Tan δ	1.039		+0.281		1.053		+0.333		1.002		−0.055		2.193		+1.951	
n Place	$7^{s}.571$		$47''.63$		$46^{s}.666$		$45''.57$		$1^{s}.564$		$41''.61$		$19^{s}.333$		$76''.56$	
z, $D_{\omega}\alpha$	−0.01		+0.01		−0.01		+0.01		0.00		0.00		−0.04		+0.07	
, $D_{\omega}\delta$	−0.2		−0.8		−0.2		−0.8		−0.2		−0.8		−0.2		−0.8	

Mean Solar Date.	ε Serpentis. Mag. 3.8				ζ Ursæ Minoris. Mag. 4.3				β Triang. Aust. Mag. 3.0				λ Libræ. Mag. 5.1			
	Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination S.	
	h m 15 46 s		° ' + 4 44 "		h m 15 47 s		° ' +78 3 "		h m 15 47 s		° ' −63 9 "		h m 15 48 s		° ' −19 54 "	
Jan. 0.9	24.27	28	24.3	21	7.48	76	37.8	29	19.18	56	29.3	8	11.69	31	18.8	11
10.9	24.55	31	22.2	20	8.24	90	34.9	25	19.74	61	28.5	3	12.00	33	19.9	12
20.8	24.86	31	20.2	18	9.14	100	32.4	19	20.35	64	28.2	1	12.33	34	21.1	13
30.8	25.17	32	18.4	16	10.14	107	30.5	13	20.99	65	28.3	5	12.67	35	22.4	13
Feb. 9.8	25.49	32	16.8	13	11.21	110	29.2	6	21.64	65	28.8	9	13.02	34	23.7	12
19.7	25.81	31	15.5	9	12.31	110	28.6	1	22.29	63	29.7	13	13.36	33	24.9	12
29.7	26.12	29	14.6	6	13.41	105	28.7	8	22.92	60	31.0	16	13.69	31	26.1	11
Mar. 10.7	26.41	27	14.0	3	14.46	96	29.5	13	23.52	56	32.6	19	14.00	29	27.2	10
20.7	26.68	25	13.7	1	15.42	84	30.8	19	24.08	52	34.5	21	14.29	27	28.2	8
30.6	26.93	22	13.8	4	16.26	70	32.7	24	24.60	48	36.6	23	14.56	25	29.0	7
Apr. 9.6	27.15	20	14.2	6	16.96	54	35.1	27	25.08	42	38.9	25	14.81	23	29.7	6
19.6	27.35	17	14.8	9	17.50	36	37.8	30	25.50	36	41.4	25	15.04	19	30.3	5
29.6	27.52	15	15.7	10	17.86	18	40.8	31	25.86	29	43.9	27	15.23	17	30.8	4
May 9.5	27.67	11	16.7	11	18.04	0	43.9	32	26.15	22	46.6	26	15.40	14	31.2	3
19.5	27.78	9	17.8	12	18.04	18	47.1	31	26.37	16	49.2	26	15.54	10	31.5	2
29.5	27.87	5	19.0	12	17.86	36	50.2	29	26.53	8	51.8	25	15.64	7	31.7	2
June 8.4	27.92	3	20.2	12	17.50	51	53.1	26	26.61	0	54.3	23	15.71	4	31.9	1
18.4	27.95	1	21.4	11	16.99	66	55.7	23	26.61	7	56.6	21	15.75	0	32.0	0
28.4	27.94	4	22.5	10	16.33	79	58.0	19	26.54	14	58.7	19	15.75	3	32.0	0
July 8.4	27.90	7	23.5	9	15.54	90	59.9	15	26.40	21	60.6	15	15.72	6	32.0	1
18.3	27.83	9	24.4	7	14.64	98	61.4	10	26.19	27	62.1	11	15.66	9	31.9	1
28.3	27.74	12	25.1	6	13.66	105	62.4	4	25.92	31	63.2	8	15.57	11	31.8	2
Aug. 7.3	27.62	13	25.7	4	12.61	109	62.8	0	25.61	35	64.0	3	15.46	14	31.6	2
17.3	27.49	15	26.1	3	11.52	111	62.8	6	25.26	37	64.3	1	15.32	15	31.4	3
27.2	27.34	15	26.4	0	10.41	109	62.2	10	24.89	37	64.2	5	15.17	16	31.1	4
Sept. 6.2	27.19	14	26.4	1	9.32	106	61.2	16	24.52	36	63.7	10	15.01	15	30.7	4
16.2	27.05	13	26.3	4	8.26	99	59.6	21	24.16	33	62.7	14	14.86	13	30.3	4
26.1	26.92	11	25.9	6	7.27	90	57.5	25	23.83	28	61.3	17	14.73	11	29.9	4
Oct. 6.1	26.81	8	25.3	8	6.37	80	55.0	29	23.55	20	59.6	20	14.62	8	29.5	3
16.1	26.73	4	24.5	11	5.57	66	52.1	32	23.35	12	57.6	22	14.54	3	29.2	2
26.1	26.69	0	23.4	13	4.91	49	48.9	35	23.23	2	55.4	23	14.51	2	29.0	1
Nov. 5.0	26.69	5	22.1	16	4.42	32	45.4	37	23.21	8	53.1	23	14.53	7	28.9	1
15.0	26.74	10	20.5	17	4.10	12	41.7	38	23.29	19	50.8	22	14.60	11	29.0	2
25.0	26.84	15	18.8	19	3.98	8	37.9	38	23.48	28	48.6	21	14.71	16	29.2	4
Dec. 5.0	26.99	19	16.9	21	4.06	28	34.1	37	23.76	38	46.5	18	14.87	21	29.6	6
14.9	27.18	23	14.8	21	4.34	47	30.4	35	24.14	47	44.7	14	15.08	26	30.2	8
24.9	27.41	27	12.7	21	4.81	64	26.9	32	24.61	53	43.3	10	15.34	30	31.0	10
34.9	27.68		10.6		5.45		23.7		25.14		42.3		15.64		32.0	
Sec δ, Tan δ	1.003		+0.083		4.835		+4.730		2.215		−1.976		1.063		−0.362	
Mean Place	25ˢ.683		31″.63		10ˢ.714		56″.31		22ˢ.722		36″.14		13ˢ.364		17″.33	
D′ψ α, Dω α	0.00		0.00		−0.10		+0.17		+0.04		−0.07		+0.01		−0.01	
Dψ δ, Dω δ	−0.2		−0.8		−0.2		−0.8		−0.2		−0.8		−0.2		−0.8	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	γ Serpentis. Mag. 3.9				π Scorpii. Mag. 3.0				ε Coronæ Borealis. Mag. 4.2				δ Scorpii. Mag. 2.5			
	Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination S.	
	h m 15 52		° ′ +15 56		h m 15 53		° ′ −25 51		h m 15 53		° ′ +27 7		h m 15 55		° ′ −22 22	
	s		″		s		″		s		″		s		″	
Jan. 0.9	21.87	28	43.7	26	29.72	32	41.8	8	55.21	28	43.3	28	5.88	31	20.4	10
10.9	22.15	30	41.1	23	30.04	34	42.6	9	55.49	31	40.5	25	6.19	33	21.4	10
20.8	22.45	32	38.8	20	30.38	36	43.5	11	55.80	33	38.0	21	6.52	34	22.4	12
30.8	22.77	32	36.8	17	30.74	36	44.6	11	56.13	34	35.9	17	6.86	35	23.6	12
Feb. 9.8	23.09	32	35.1	13	31.10	35	45.7	12	56.47	33	34.2	12	7.21	35	24.8	12
19.7	23.41	31	33.8	8	31.45	35	46.9	12	56.80	32	33.0	7	7.56	34	26.0	11
29.7	23.72	30	33.0	4	31.80	33	48.1	12	57.12	31	32.3	2	7.90	32	27.1	11
Mar. 10.7	24.02	28	32.6	0	32.13	31	49.3	11	57.43	29	32.1	3	8.22	30	28.2	10
20.7	24.30	25	32.6	4	32.44	29	50.4	10	57.72	27	32.4	9	8.52	28	29.2	9
30.6	24.55	23	33.0	8	32.73	26	51.4	9	57.99	24	33.3	13	8.80	26	30.1	8
Apr. 9.6	24.78	20	33.8	11	32.99	24	52.3	9	58.23	21	34.6	16	9.06	23	30.9	7
19.6	24.98	18	34.9	14	33.23	21	53.2	8	58.44	17	36.2	19	9.29	21	31.6	5
29.6	25.16	15	36.3	16	33.44	18	54.0	7	58.61	14	38.1	21	9.50	18	32.1	5
May 9.5	25.31	11	37.9	17	33.62	15	54.7	6	58.75	11	40.2	23	9.68	14	32.6	5
19.5	25.42	8	39.6	18	33.77	11	55.3	6	58.86	7	42.5	23	9.82	12	33.1	3
29.5	25.50	5	41.4	17	33.88	8	55.9	5	58.93	4	44.8	22	9.94	8	33.4	3
June 8.4	25.55	2	43.1	17	33.96	5	56.4	4	58.97	0	47.0	21	10.02	4	33.7	2
18.4	25.57	2	44.8	15	34.01	1	56.8	3	58.97	4	49.1	19	10.06	1	33.9	2
28.4	25.55	5	46.3	13	34.02	3	57.1	3	58.93	7	51.0	17	10.07	2	34.1	1
July 8.4	25.50	8	47.6	12	33.99	7	57.4	2	58.86	10	52.7	15	10.05	6	34.2	0
18.3	25.42	10	48.8	10	33.92	9	57.6	0	58.76	13	54.2	11	9.99	9	34.2	0
28.3	25.32	13	49.8	7	33.83	12	57.6	0	58.63	15	55.3	8	9.90	12	34.2	1
Aug. 7.3	25.19	14	50.5	4	33.71	14	57.6	2	58.48	17	56.1	5	9.78	14	34.1	2
17.3	25.05	16	50.9	1	33.57	16	57.4	3	58.31	18	56.6	1	9.64	15	33.9	3
27.2	24.89	17	51.0	1	33.41	17	57.1	4	58.13	19	56.7	3	9.49	16	33.6	3
Sept. 6.2	24.72	16	50.9	4	33.24	16	56.7	4	57.94	18	56.4	6	9.33	15	33.3	4
16.2	24.56	14	50.5	8	33.08	14	56.3	5	57.76	17	55.8	10	9.18	14	32.9	5
26.1	24.42	13	49.7	11	32.94	12	55.8	6	57.59	15	54.8	14	9.04	12	32.4	4
Oct. 6.1	24.29	10	48.6	13	32.82	9	55.2	6	57.44	12	53.4	17	8.92	9	32.0	4
16.1	24.19	6	47.3	16	32.73	4	54.6	6	57.32	8	51.7	21	8.83	4	31.6	4
26.1	24.13	1	45.7	19	32.69	1	54.0	4	57.24	3	49.6	24	8.79	1	31.2	3
Nov. 5.0	24.12	3	43.8	22	32.70	6	53.6	3	57.21	2	47.2	26	8.80	6	30.9	1
15.0	24.15	8	41.6	23	32.76	11	53.3	1	57.23	7	44.6	28	8.86	11	30.8	1
25.0	24.23	14	39.3	25	32.87	17	53.2	0	57.30	12	41.8	30	8.97	16	30.9	2
Dec. 5.0	24.37	19	36.8	27	33.04	23	53.2	2	57.42	18	38.8	31	9.13	22	31.1	4
14.9	24.56	22	34.1	26	33.27	27	53.4	4	57.60	22	35.7	30	9.35	26	31.5	7
24.9	24.78	26	31.5	26	33.54	30	53.8	7	57.82	26	32.7	29	9.61	29	32.2	9
34.9	25.04		28.9		33.84		54.5		58.08		29.8		9.90		33.1	
Sec δ, Tan δ	1.040		+0.286		1.111		−0.485		1.124		+0.512		1.081		−0.412	
Mean Place	$23^{\mathrm{s}}.258$		$53''.62$		$31^{\mathrm{s}}.524$		$41''.37$		$56^{\mathrm{s}}.597$		$55''.59$		$7^{\mathrm{s}}.620$		$19''.12$	
$D'_{\psi}\alpha$, $D_{\omega}\alpha$	−0.01		+0.01		+0.01		−0.02		−0.01		+0.02		+0.01		−0.01	
$D_{\psi}\delta$, $D_{\omega}\delta$	−0.2		−0.8		−0.2		−0.9		−0.2		−0.9		−0.2		−0.9	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	θ Draconis. Mag. 4.1				β Scorpii. Mag. 2.9				κ Herculis. Mag. 5.3				φ Herculis. Mag. 4.3			
	Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination N.	
	h m 16 0		° ′ +58 47		h m 16 0		° ′ −19 33		h m 16 4		° ′ +17 16		h m 16 5		° ′ +45 9	
	s		″		s		″		s		″		s		″	
Jan. 0.9	12.58		43.2		17.31		57.1		4.67		39.7		58.25		39.6	
10.9	12.94	36	40.0	32	17.61	30	58.2	11	4.94	27	37.2	25	58.55	30	36.5	31
20.8	13.35	41	37.3	27	17.93	32	59.3	11	5.24	30	34.9	23	58.89	34	33.7	28
30.8	13.80	45	35.1	22	18.27	34	60.5	12	5.55	31	32.8	21	59.26	37	31.4	23
Feb. 9.8	14.28	48	33.4	17	18.61	34	61.7	12	5.87	32	31.1	17	59.64	38	29.6	18
19.8	14.78	50	32.4	10	18.95	34	62.9	12	6.19	32	29.8	13	60.03	39	28.4	12
29.7	15.27	49	32.1	3	19.28	33	64.0	11	6.51	32	29.0	8	60.41	38	27.8	6
Mar. 10.7	15.74	47	32.4	3	19.60	32	65.0	10	6.81	30	28.6	4	60.78	37	27.9	1
20.7	16.18	44	33.4	10	19.90	30	65.9	9	7.09	28	28.7	1	61.13	35	28.6	7
30.6	16.58	40	35.0	16	20.18	28	66.7	8	7.35	26	29.2	5	61.45	32	29.9	13
Apr. 9.6	16.92	34	37.1	21	20.44	26	67.3	6	7.59	24	30.1	9	61.73	28	31.6	17
19.6	17.21	29	39.6	25	20.67	23	67.8	5	7.80	21	31.3	12	61.98	25	33.8	22
29.6	17.43	22	42.4	28	20.88	21	68.2	4	7.99	19	32.8	15	62.18	20	36.3	25
May 9.5	17.59	16	45.4	30	21.05	17	68.5	3	8.14	15	34.5	17	62.33	15	39.1	28
19.5	17.68	9	48.6	32	21.20	15	68.7	2	8.26	12	36.3	18	62.44	11	41.9	28
29.5	17.70	2	51.7	31	21.32	12	68.9	2	8.35	9	38.2	19	62.50	6	44.8	29
June 8.5	17.66	4	54.7	30	21.40	8	69.0	1	8.41	6	40.0	18	62.52	2	47.6	28
18.4	17.55	11	57.5	28	21.45	5	69.1	1	8.44	3	41.8	18	62.49	3	50.3	27
28.4	17.38	17	60.1	26	21.47	2	69.1	0	8.43	1	43.5	17	62.41	8	52.7	24
July 8.4	17.15	23	62.3	22	21.45	2	69.1	0	8.38	5	45.0	15	62.29	12	54.9	22
18.3	16.88	27	64.1	18	21.40	5	69.0	1	8.31	7	46.3	13	62.13	16	56.7	18
28.3	16.56	32	65.4	13	21.31	9	68.9	1	8.21	10	47.4	11	61.93	20	58.1	14
Aug. 7.3	16.21	35	66.3	9	21.20	11	68.8	1	8.08	13	48.2	8	61.71	22	59.1	10
17.3	15.83	38	66.7	4	21.06	14	68.6	2	7.93	15	48.7	5	61.46	25	59.6	5
27.2	15.44	39	66.6	1	20.91	15	68.3	3	7.77	16	49.0	3	61.20	26	59.7	1
Sept. 6.2	15.04	40	66.0	6	20.76	15	68.0	3	7.60	17	48.9	1	60.93	27	59.3	4
16.2	14.65	39	64.8	12	20.60	16	67.6	4	7.43	17	48.5	4	60.66	27	58.4	9
26.2	14.28	37	63.2	16	20.46	14	67.3	3	7.27	16	47.9	6	60.41	25	57.1	13
Oct. 6.1	13.95	33	61.1	21	20.34	12	67.0	3	7.14	13	46.9	10	60.19	22	55.4	17
16.1	13.66	29	58.5	26	20.26	8	66.7	3	7.03	11	45.6	13	60.00	19	53.2	22
26.1	13.43	23	55.6	29	20.21	5	66.5	2	6.96	7	44.0	16	59.85	15	50.6	26
Nov. 5.0	13.27	16	52.3	33	20.21	0	66.4	1	6.93	3	42.1	19	59.76	9	47.6	30
15.0	13.18	9	48.8	35	20.26	5	66.4	0	6.95	2	40.0	21	59.72	4	44.4	32
25.0	13.18	0	45.1	37	20.37	11	66.6	2	7.02	7	37.6	24	59.75	3	41.0	34
Dec. 5.0	13.26	8	41.3	38	20.53	16	67.0	4	7.14	12	35.1	25	59.84	9	37.4	36
14.9	13.43	17	37.5	38	20.73	20	67.6	6	7.31	17	32.5	26	60.00	16	33.9	35
24.9	13.68	25	33.9	36	20.98	25	68.4	8	7.52	21	29.8	27	60.22	22	30.4	35
34.9	14.00	32	30.5	34	21.27	29	69.4	10	7.78	26	27.2	26	60.49	27	27.1	33
Sec δ, Tan δ	1.930		+1.651		1.061		−0.355		1.048		+0.311		1.418		+1.006	
Mean Place	14ˢ.370		60″.10		19ˢ.023		54″.92		6ˢ.112		50″.07		59ˢ.815		54″.74	
$D'_\psi \alpha$, $D_\omega \alpha$	−0.04		+0.06		+0.01		−0.01		−0.01		+0.01		−0.02		+0.03	
$D_\psi \delta$, $D_\omega \delta$	−0.2		−0.9		−0.2		−0.9		−0.2		−0.9		−0.2		−0.9	

an Solar Date.	**Groombridge 2320.** Mag. 5.4				**δ¹ Apodis.** Mag. 4.8				**δ Ophiuchi.** Mag. 3.0				**σ Cor. Bor.** *seq.* Mag. 5.8			
	Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination S.		Right Ascension.		Declination N.	
	h m 16 6		° ′ +68 2		h m 16 7		° ′ −78 28		h m 16 9		° ′ − 3 28		h m 16 11		° ′ +34 4	
	s		″		s		″		s		″		s		″	
n. 0.9	2.40		13.1		1.59		26.4		42.39		12.3		21.46		39.1	
10.9	2.84	44	9.9	32	2.69	110	24.8	16	42.66	27	14.0	17	21.73	27	36.1	30
20.8	3.36	52	7.1	28	3.91	122	23.7	11	42.96	30	15.7	17	22.04	31	33.4	27
30.8	3.94	58	4.9	22	5.21	130	23.1	6	43.27	31	17.3	16	22.37	33	31.1	23
b. 9.8	4.56	62	3.3	16	6.56	135	23.0	1	43.59	32	18.7	14	22.71	34	29.3	18
19.8	5.20	64	2.4	9	7.93	137	23.4	4	43.91	32	19.9	12	23.06	35	28.0	13
29.7	5.84	64	2.1	3	9.29	136	24.2	8	44.22	31	20.9	10	23.40	34	27.3	7
ar. 10.7	6.46	62	2.5	4	10.61	132	25.5	13	44.52	30	21.7	8	23.73	33	27.2	1
20.7	7.04	58	3.5	10	11.87	126	27.2	17	44.80	28	22.1	4	24.04	31	27.6	4
30.6	7.57	53	5.1	16	13.05	118	29.3	21	45.07	27	22.3	2	24.33	29	28.6	10
r. 9.6	8.03	46	7.3	22	14.12	107	31.6	23	45.32	25	22.3	0	24.59	26	30.0	14
19.6	8.41	38	9.9	26	15.07	95	34.2	26	45.54	22	22.0	3	24.82	23	31.8	18
29.6	8.69	28	12.8	29	15.88	81	37.1	29	45.74	20	21.5	5	25.02	20	33.9	21
y 9.5	8.88	19	15.9	31	16.54	66	40.1	30	45.91	17	20.9	6	25.18	16	36.3	24
19.5	8.97	9	19.1	32	17.04	50	43.2	31	46.05	14	20.1	8	25.30	12	38.8	25
29.5	8.97	0	22.3	32	17.37	33	46.3	31	46.16	11	19.3	8	25.38	8	41.4	26
ne 8.5	8.87	10	25.3	30	17.53	16	49.4	31	46.24	8	18.5	8	25.42	4	44.0	26
18.4	8.68	19	28.2	29	17.51	2	52.3	29	46.29	5	17.7	8	25.42	0	46.4	24
28.4	8.40	28	30.8	26	17.31	20	55.1	28	46.31	2	16.9	8	25.38	4	48.7	23
ly 8.4	8.05	35	33.0	22	16.94	37	57.6	25	46.29	2	16.2	7	25.31	7	50.7	20
18.3	7.63	42	34.8	18	16.42	52	59.7	21	46.24	5	15.5	7	25.20	11	52.4	17
28.3	7.15	48	36.2	14	15.76	66	61.5	18	46.16	8	14.9	6	25.06	14	53.8	14
g. 7.3	6.62	53	37.1	9	14.98	78	62.8	13	46.05	11	14.4	5	24.89	17	54.8	10
17.3	6.06	56	37.4	3	14.12	86	63.6	8	45.92	13	14.0	4	24.69	20	55.4	6
27.2	5.48	58	37.3	1	13.20	92	63.9	3	45.78	14	13.7	3	24.48	21	55.6	2
pt. 6.2	4.89	59	36.6	7	12.26	94	63.6	3	45.63	15	13.5	2	24.27	21	55.4	2
16.2	4.32	57	35.4	12	11.35	91	62.8	8	45.48	15	13.5	0	24.06	21	54.8	6
26.2	3.77	55	33.7	17	10.50	85	61.5	13	45.34	14	13.6	1	23.85	21	53.8	10
t. 6.1	3.27	50	31.6	21	9.76	74	59.7	18	45.22	12	13.9	3	23.67	18	52.3	15
16.1	2.83	44	29.0	26	9.16	60	57.5	22	45.13	9	14.3	4	23.52	15	50.4	19
26.1	2.46	37	26.0	30	8.73	43	55.0	25	45.07	6	14.9	6	23.41	11	48.2	22
v. 5.0	2.18	28	22.7	33	8.50	23	52.3	27	45.06	1	15.7	8	23.34	7	45.7	25
15.0	2.00	18	19.1	36	8.49	1	49.4	29	45.09	3	16.7	10	23.33	1	42.9	28
25.0	1.94	6	15.3	38	8.70	21	46.5	29	45.17	8	17.9	12	23.37	4	39.8	31
c. 5.0	1.99	5	11.5	38	9.14	44	43.8	27	45.31	14	19.3	14	23.47	10	36.6	32
14.9	2.15	16	7.7	38	9.79	65	41.2	26	45.49	18	20.8	15	23.62	15	33.3	33
24.9	2.42	27	4.0	37	10.63	84	39.0	22	45.71	22	22.4	16	23.82	20	30.0	33
34.9	2.80	38	0.6	34	11.64	101	37.1	19	45.97	26	24.1	17	24.07	25	26.9	31
, Tan δ	2.674		+2.480		5.007		−4.906		1.002		−0.061		1.207		+0.677	
n Place	4ˢ.709		30″.53		9ˢ.463		32″.91		43ˢ.949		6″.16		22ˢ.959		52″.46	
, D$_\omega$ α	−0.06		+0.08		+0.11		−0.16		0.00		0.00		−0.02		+0.02	
, D$_\omega$ δ	−0.2		−0.9		−0.2		−0.9		−0.2		−0.9		−0.2		−0.9	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	γ² Normæ. Mag. 4.1 Right Ascension.		γ² Normæ. Declination S.		19 Ursæ Minoris. Mag. 5.5 Right Ascension.		19 Ursæ Minoris. Declination N.		ε Ophiuchi. Mag. 3.3 Right Ascension.		ε Ophiuchi. Declination S.		σ Scorpii. Mag. 3.1 Right Ascension.		σ Scorpii. Declination S.
	h m 16 13		° ′ −49 56		h m 16 13		° ′ +76 5		h m 16 13		° ′ − 4 28		h m 16 15		° −25
	s		″		s		″		s		″		s		″
Jan. 0.9	12.20		23.3		15.73		40.6		38.22		49.2		48.35		58.5
10.9	12.60	40	22.8	5	16.32	59	37.4	32	38.50	28	50.9	17	48.65	30	59.2
20.8	13.04	44	22.6	2	17.03	71	34.7	27	38.79	29	52.5	16	48.98	33	60.0
30.8	13.50	46	22.7	1	17.85	82	32.5	22	39.10	31	54.1	16	49.33	35	60.9
Feb. 9.8	13.97	47	23.1	4	18.75	90	30.9	16	39.42	32	55.5	14	49.68	35	61.8
19.8	14.45	48	23.8	7	19.70	95	29.9	10	39.74	32	56.7	12	50.03	35	62.8
29.7	14.92	47	24.8	10	20.66	96	29.6	3	40.06	32	57.7	10	50.38	35	63.8
Mar. 10.7	15.37	45	25.9	11	21.59	93	30.0	4	40.36	30	58.4	7	50.72	34	64.8
20.7	15.80	43	27.3	14	22.46	87	31.0	10	40.65	29	58.9	5	51.04	32	65.7
30.7	16.21	41	28.8	15	23.25	79	32.6	16	40.92	27	59.1	2	51.34	30	66.6
Apr. 9.6	16.59	38	30.5	17	23.94	69	34.8	22	41.17	25	59.1	0	51.62	28	67.3
19.6	16.93	34	32.2	17	24.50	56	37.4	26	41.40	23	58.8	3	51.87	25	68.0
29.6	17.24	31	34.0	18	24.92	42	40.3	29	41.60	20	58.3	5	52.10	23	68.7
May 9.5	17.50	26	35.9	19	25.18	26	43.4	31	41.77	17	57.7	6	52.31	21	69.3
19.5	17.72	22	37.8	19	25.29	11	46.6	32	41.92	15	57.0	7	52.48	17	69.8
29.5	17.89	17	39.7	19	25.24	5	49.7	31	42.04	12	56.3	7	52.62	14	70.2
June 8.5	18.01	12	41.5	18	25.04	20	52.8	31	42.13	9	55.5	8	52.72	10	70.6
18.4	18.08	7	43.2	17	24.69	35	55.7	29	42.18	5	54.7	8	52.79	7	71.0
28.4	18.09	1	44.8	16	24.21	48	58.3	26	42.20	2	54.0	7	52.82	3	71.4
July 8.4	18.05	4	46.2	14	23.61	60	60.5	22	42.18	2	53.3	7	52.81	1	71.6
18.4	17.95	10	47.4	12	22.90	71	62.3	18	42.14	4	52.6	7	52.76	5	71.8
28.3	17.81	14	48.4	10	22.09	81	63.7	14	42.06	8	52.0	6	52.68	8	71.9
Aug. 7.3	17.63	18	49.1	7	21.22	87	64.6	9	41.95	11	51.6	4	52.57	11	72.0
17.3	17.41	22	49.5	4	20.29	93	65.0	4	41.82	13	51.2	4	52.43	14	71.9
27.2	17.18	23	49.5	0	19.34	95	64.9	1	41.68	14	50.9	3	52.27	16	71.7
Sept. 6.2	16.93	25	49.2	3	18.37	97	64.2	7	41.53	15	50.7	2	52.11	16	71.4
16.2	16.68	25	48.5	7	17.42	95	63.0	12	41.38	15	50.6	1	51.94	17	71.1
26.2	16.45	23	47.6	9	16.52	90	61.4	16	41.24	14	50.7	1	51.78	16	70.7
Oct. 6.1	16.25	20	46.4	12	15.67	85	59.3	21	41.12	12	50.9	2	51.65	13	70.2
16.1	16.09	16	45.0	14	14.91	76	56.7	26	41.02	10	51.3	4	51.55	10	69.6
26.1	15.99	10	43.4	16	14.27	64	53.8	29	40.96	6	51.8	5	51.49	6	69.2
Nov. 5.1	15.96	3	41.7	17	13.76	51	50.5	33	40.94	2	52.6	8	51.47	2	68.8
15.0	16.00	4	40.0	17	13.39	37	46.9	36	40.97	3	53.5	9	51.51	4	68.5
25.0	16.12	12	38.4	16	13.18	21	43.2	37	41.05	8	54.6	11	51.60	9	68.3
Dec. 5.0	16.31	19	36.9	15	13.15	3	39.4	38	41.18	13	55.9	13	51.75	15	68.2
14.9	16.57	26	35.6	13	13.30	15	35.7	37	41.36	18	57.3	14	51.95	20	68.4
24.9	16.89	32	34.6	10	13.62	32	32.0	37	41.58	22	58.9	16	52.20	25	68.8
34.9	17.27	38	33.9	7	14.10	48	28.6	34	41.84	26	60.5	16	52.48	28	69.3
Sec δ, Tan δ	1.554		−1.189		4.162		+4.040		1.003		−0.079		1.107		−0.474
Mean Place	14ˢ.835		26″.01		19ˢ.162		58″.06		39ˢ.811		43″.22		50ˢ.213		56″.69
D′ψ α, Dω α	+0.03		−0.04		−0.10		+0.12		0.00		0.00		+0.01		−0.02
Dψ δ, Dω δ	−0.2		−0.9		−0.2		−0.9		−0.2		−0.9		−0.2		−0.9

Mean Solar Date.	**τ Herculis.** Mag. 3.9				**γ Herculis.** Mag. 3.8				**γ Apodis.** Mag. 3.9				**η Ursæ Minoris.** Mag. 5.0			
	Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination N.	
	h m 16 17		° ′ +46 30		h m 16 18		° ′ +19 21		h m 16 19		° ′ −78 41		h m 16 19		° ′ +75 57	
	s		″		s		″		s		″		s		″	
Jan. 0.9	4.09		65.8		0.76		22.0		46.97		59.5		60.17		13.5	
10.9	4.38	29	62.6	32	1.02	26	19.4	26	48.05	108	57.8	17	60.72	55	10.3	32
20.8	4.71	33	59.7	29	1.30	28	17.0	24	49.26	121	56.5	13	61.40	68	7.5	28
30.8	5.07	36	57.3	24	1.61	31	14.9	21	50.57	131	55.7	8	62.20	80	5.2	23
Feb. 9.8	5.46	39	55.4	19	1.93	32	13.1	18	51.94	137	55.3	4	63.08	88	3.5	17
19.8	5.85	39	54.1	13	2.25	32	11.8	13	53.34	140	55.5	2	64.01	93	2.5	10
29.7	6.24	39	53.5	6	2.56	31	10.9	9	54.74	140	56.1	6	64.95	94	2.1	4
Mar. 10.7	6.62	38	53.5	0	2.87	31	10.5	4	56.11	137	57.2	11	65.88	93	2.4	3
20.7	6.98	36	54.1	6	3.16	29	10.6	1	57.42	131	58.7	15	66.76	88	3.4	10
30.7	7.31	33	55.3	12	3.43	27	11.1	5	58.66	124	60.6	19	67.55	79	4.9	15
Apr. 9.6	7.61	30	57.0	17	3.68	25	12.1	10	59.79	113	62.8	22	68.25	70	7.0	21
19.6	7.87	26	59.2	22	3.90	22	13.4	13	60.81	102	65.3	25	68.82	57	9.5	25
29.6	8.09	22	61.7	25	4.10	20	15.0	16	61.69	88	68.0	27	69.25	43	12.4	29
May 9.5	8.26	17	64.5	28	4.27	17	16.8	18	62.43	74	70.9	29	69.54	29	15.5	31
19.5	8.38	12	67.4	29	4.40	13	18.7	19	63.00	57	73.9	30	69.67	13	18.7	32
29.5	8.45	7	70.3	29	4.51	11	20.7	20	63.40	40	77.0	31	69.65	2	21.9	32
June 8.5	8.48	3	73.2	29	4.57	6	22.7	20	63.62	22	80.1	31	69.47	18	25.0	31
18.4	8.45	3	76.0	28	4.61	4	24.7	20	63.65	3	83.1	30	69.15	32	27.9	29
28.4	8.38	7	78.5	25	4.61	0	26.5	18	63.50	15	85.9	28	68.69	46	30.6	27
July 8.4	8.26	12	80.8	23	4.57	4	28.2	17	63.18	32	88.4	25	68.11	58	32.9	23
18.4	8.10	16	82.7	19	4.50	7	29.6	14	62.69	49	90.7	23	67.42	69	34.8	19
28.3	7.90	20	84.3	16	4.40	10	30.8	12	62.05	64	92.6	19	66.64	78	36.3	15
Aug. 7.3	7.67	23	85.4	11	4.27	13	31.7	9	61.28	77	94.0	14	65.78	86	37.3	10
17.3	7.42	25	86.1	7	4.12	15	32.4	7	60.42	86	95.0	10	64.87	91	37.8	5
27.2	7.15	27	86.3	2	3.95	17	32.7	3	59.49	93	95.4	4	63.92	95	37.8	0
Sept. 6.2	6.87	28	86.0	3	3.78	17	32.7	0	58.53	96	95.3	1	62.96	96	37.2	6
16.2	6.59	28	85.2	8	3.60	18	32.4	3	57.58	95	94.7	6	62.02	94	36.2	10
26.2	6.32	27	84.0	12	3.43	17	31.7	7	56.69	89	93.5	12	61.11	91	34.6	16
Oct. 6.1	6.08	24	82.3	17	3.28	15	30.7	10	55.89	80	91.9	16	60.25	86	32.6	20
16.1	5.87	21	80.2	21	3.16	12	29.4	13	55.23	66	89.8	21	59.48	77	30.2	24
26.1	5.70	17	77.7	25	3.08	8	27.8	16	54.74	49	87.4	24	58.82	66	27.3	29
Nov. 5.1	5.58	12	74.8	29	3.04	4	25.9	19	54.45	29	84.7	27	58.29	53	24.1	32
15.0	5.53	5	71.6	32	3.04	0	23.7	22	54.37	8	81.8	29	57.90	39	20.6	35
25.0	5.54	1	68.2	34	3.09	5	21.3	24	54.53	16	78.9	29	57.67	23	16.9	37
Dec. 5.0	5.61	7	64.6	36	3.19	10	18.7	26	54.91	38	76.1	28	57.61	6	13.2	37
14.9	5.75	14	61.0	36	3.35	16	16.0	27	55.51	60	73.5	26	57.73	12	9.4	38
24.9	5.96	21	57.5	35	3.55	20	13.3	27	56.32	81	71.1	24	58.02	29	5.8	36
34.9	6.22	26	54.1	34	3.79	24	10.7	26	57.31	99	69.1	20	58.47	45	2.4	34
Sec δ, Tan δ	1.453		+1.055		1.060		+0.351		5.106		−5.007		4.121		+3.998	
Mean Place	$5^{s}.740$		80″.78		$2^{s}.249$		32″.78		$55^{s}.120$		64″.78		$63^{s}.696$		30″.65	
$D'_{\psi}\alpha$, $D_{\omega}\alpha$	−0.03		+0.03		−0.01		+0.01		+0.12		−0.14		−0.10		+0.11	
$D_{\psi}\delta$, $D_{\omega}\delta$	−0.2		−0.9		−0.2		−0.9		−0.2		−0.9		−0.2		−0.9	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	ω Herculis. Mag. 4.5 Right Ascension.		ω Herculis. Declination N.		η Draconis. Mag. 2.9 Right Ascension.		η Draconis. Declination N.		α Scorpii. Mag. 1.2 Right Ascension.		α Scorpii. Declination S.		β Herculis. Mag. 2.8 Right Ascension.		β Herculis. Declination N.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	16 21		+14 13		16 22		+61 42		16 23		−26 14		16 26		+21 40	
	s		″		s		″		s		″		s		″	
Jan. 0.9	19.52		57.0		45.73		31.1		58.65		17.1		24.62		39.2	
10.9	19.78	26	54.6	24	46.07	34	27.7	34	58.95	30	17.6	5	24.87	25	36.5	27
20.9	20.06	28	52.3	23	46.48	41	24.8	29	59.28	33	18.3	7	25.15	28	34.0	25
30.8	20.36	30	50.3	20	46.94	46	22.4	24	59.62	34	19.1	8	25.45	30	31.8	22
Feb. 9.8	20.67	31	48.6	17	47.44	50	20.5	19	59.97	35	20.0	9	25.77	32	30.0	18
19.8	20.99	32	47.3	13	47.96	52	19.3	12	60.33	36	20.9	9	26.09	32	28.7	13
29.7	21.30	31	46.4	9	48.49	53	18.7	6	60.68	35	21.8	9	26.41	32	27.8	9
Mar. 10.7	21.61	31	45.9	5	49.00	51	18.8	1	61.02	34	22.8	10	26.72	31	27.4	4
20.7	21.90	29	45.8	1	49.49	49	19.6	8	61.34	32	23.6	8	27.01	29	27.5	1
30.7	22.17	27	46.2	4	49.94	45	21.0	14	61.65	31	24.4	8	27.29	28	28.0	5
Apr. 9.6	22.42	25	47.0	8	50.34	40	23.0	20	61.94	29	25.2	8	27.55	26	29.0	10
19.6	22.64	22	48.1	11	50.68	34	25.4	24	62.20	26	25.9	7	27.78	23	30.4	14
29.6	22.84	20	49.4	13	50.95	27	28.1	27	62.44	24	26.5	6	27.98	20	32.1	17
May 9.6	23.01	17	51.0	16	51.15	20	31.1	30	62.65	21	27.1	6	28.16	18	34.0	19
19.5	23.15	14	52.7	17	51.28	13	34.3	32	62.83	18	27.6	5	28.30	14	36.1	21
29.5	23.26	11	54.4	17	51.34	6	37.5	32	62.98	15	28.1	5	28.41	11	38.2	21
June 8.5	23.34	8	56.2	18	51.32	2	40.6	31	63.09	11	28.5	4	28.48	7	40.3	21
18.4	23.38	4	58.0	18	51.22	10	43.6	30	63.17	8	28.9	4	28.52	4	42.4	21
28.4	23.39	1	59.6	16	51.06	16	46.4	28	63.21	4	29.3	4	28.52	0	44.3	19
July 8.4	23.36	3	61.1	15	50.83	23	48.8	24	63.20	1	29.6	3	28.49	3	46.1	18
18.4	23.30	6	62.4	13	50.54	29	50.8	20	63.16	4	29.9	3	28.42	7	47.7	16
28.3	23.21	9	63.5	11	50.20	34	52.4	16	63.08	8	30.1	2	28.32	10	49.0	13
Aug. 7.3	23.10	11	64.4	9	49.82	38	53.6	12	62.98	10	30.1	0	28.19	13	50.0	10
17.3	22.96	14	65.0	6	49.40	42	54.3	7	62.84	14	30.1	0	28.03	16	50.7	7
27.3	22.80	16	65.3	3	48.96	44	54.5	2	62.68	16	30.0	1	27.86	17	51.1	4
Sept. 6.2	22.63	17	65.4	1	48.50	46	54.1	4	62.52	16	29.8	2	27.68	18	51.1	0
16.2	22.46	17	65.2	2	48.05	45	53.2	9	62.35	17	29.4	4	27.50	18	50.8	3
26.2	22.30	16	64.7	5	47.62	43	51.9	13	62.19	16	29.0	4	27.32	18	50.2	6
Oct. 6.1	22.16	14	63.9	8	47.22	40	50.0	19	62.05	14	28.5	5	27.16	16	49.2	10
16.1	22.04	12	62.8	11	46.87	35	47.7	23	61.94	11	28.0	5	27.03	13	47.8	14
26.1	21.96	8	61.4	14	46.57	30	44.9	28	61.87	7	27.5	5	26.93	10	46.2	16
Nov. 5.1	21.92	4	59.7	17	46.34	23	41.8	31	61.85	2	27.0	5	26.88	5	44.2	20
15.0	21.93	1	57.8	19	46.19	15	38.4	34	61.88	3	26.7	3	26.87	1	42.0	22
25.0	21.99	6	55.6	22	46.13	6	34.7	37	61.96	8	26.4	3	26.91	4	39.5	25
Dec. 5.0	22.09	10	53.3	23	46.16	3	30.9	38	62.10	14	26.3	1	27.00	9	36.8	27
14.9	22.24	15	50.9	24	46.28	12	27.1	38	62.30	20	26.4	1	27.15	15	34.0	28
24.9	22.44	20	48.4	25	46.49	21	23.4	37	62.54	24	26.7	3	27.34	19	31.2	28
34.9	22.68	24	45.9	25	46.79	30	19.9	35	62.82	28	27.1	4	27.57	23	28.5	27
Sec δ, Tan δ	1.031		+0.254		+2.110		+1.858		1.115		−0.493		1.076		+0.397	
Mean Place	21ˢ.036		66″.86		47ˢ.851		47″.40		60ˢ.553		14″.92		26ˢ.144		50″.37	
D′ψ α, Dω α	−0.01		+0.01		−0.04		+0.05		+0.01		−0.01		−0.01		+0.01	
Dψ δ, Dω δ	−0.2		−0.9		−0.2		−0.9		−0.2		−0.9		−0.2		−0.9	

FOR THE UPPER TRANSIT AT WASHINGTON.

n Solar Date.	λ Ophiuchi. Mag. 3.8				A Draconis. Mag. 5.0				τ Scorpii. Mag. 2.9				σ Herculis. Mag. 4.2			
	Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination N.	
	h m 16 26		° ' + 2 10		h m 16 28		° ' +68 57		h m 16 30		° ' −28 2		h m 16 31		° ' +42 36	
	s		"		s		"		s		"		s		"	
m. 0.9	26.86		25.4		6.30		14.3		22.14		5.5		14.26		50.3	
10.9	27.12	26	23.5	19	6.69	39	10.9	34	22.44	30	5.9	4	14.53	27	47.1	32
20.9	27.40	28	21.6	19	7.18	49	8.0	29	22.76	32	6.5	6	14.84	31	44.2	29
30.8	27.70	30	19.9	17	7.74	56	5.5	25	23.11	35	7.2	7	15.17	33	41.7	25
eb. 9.8	28.01	31	18.4	15	8.36	62	3.6	19	23.47	36	8.0	8	15.53	36	39.7	20
19.8	28.32	31	17.2	12	9.01	65	2.4	12	23.83	36	8.8	8	15.90	37	38.3	14
29.7	28.63	31	16.2	10	9.68	67	1.9	5	24.18	35	9.7	9	16.27	37	37.5	8
ar.10.7	28.93	30	15.6	6	10.33	65	2.0	1	24.53	35	10.6	9	16.63	36	37.3	2
20.7	29.22	29	15.3	3	10.95	62	2.8	8	24.86	33	11.4	8	16.98	35	37.8	5
30.7	29.50	28	15.3	0	11.53	58	4.2	14	25.18	32	12.2	8	17.31	33	38.8	10
pr. 9.6	29.75	25	15.6	3	12.04	51	6.2	20	25.48	30	13.0	8	17.61	30	40.4	16
19.6	29.98	23	16.2	6	12.47	43	8.6	24	25.75	27	13.7	7	17.87	26	42.4	20
29.6	30.19	21	17.0	8	12.81	34	11.4	28	26.00	25	14.4	7	18.10	23	44.7	23
ay 9.6	30.37	18	18.0	10	13.05	24	14.4	30	26.22	22	15.0	6	18.28	18	47.4	27
19.5	30.52	15	19.1	11	13.20	15	17.6	32	26.41	19	15.6	6	18.42	14	50.2	28
29.5	30.65	13	20.2	11	13.25	5	20.9	33	26.57	16	16.2	6	18.52	10	53.1	29
une 8.5	30.74	9	21.4	12	13.19	6	24.1	32	26.69	12	16.7	5	18.57	5	56.0	29
. 18.4	30.80	6	22.6	12	13.03	16	27.1	30	26.77	8	17.2	5	18.57	0	58.7	27
28.4	30.82	2	23.7	11	12.78	25	29.9	28	26.81	4	17.7	5	18.53	4	61.3	26
ly 8.4	30.81	1	24.8	11	12.44	34	32.3	24	26.82	1	18.1	4	18.44	9	63.6	23
18.4	30.77	4	25.7	9	12.03	41	34.4	21	26.78	4	18.5	4	18.31	13	65.6	20
28.3	30.70	7	26.5	8	11.54	49	36.0	16	26.70	8	18.7	2	18.14	17	67.3	17
g. 7.3	30.59	11	27.1	6	11.00	54	37.2	12	26.60	10	18.9	2	17.94	20	68.6	13
17.3	30.46	13	27.6	5	10.42	58	37.9	7	26.46	14	18.9	0	17.71	23	69.5	9
27.3	30.32	14	28.0	4	9.81	61	38.1	2	26.30	16	18.8	1	17.46	25	69.9	4
pt. 6.2	30.17	15	28.1	1	9.19	62	37.8	3	26.13	17	18.6	2	17.20	26	69.8	1
16.2	30.01	16	28.1	0	8.56	63	36.9	9	25.96	17	18.3	3	16.94	26	69.2	6
26.2	29.86	15	27.9	2	7.96	60	35.5	14	25.79	17	17.9	4	16.69	25	68.2	10
t. 6.1	29.73	13	27.4	5	7.40	56	33.6	19	25.65	14	17.4	5	16.46	23	66.8	14
16.1	29.62	11	26.8	6	6.89	51	31.3	23	25.53	12	16.8	6	16.26	20	64.9	19
26.1	29.54	8	26.0	8	6.45	44	28.5	28	25.45	8	16.2	6	16.09	17	62.6	23
v. 5.1	29.51	3	24.9	11	6.10	35	25.4	31	25.42	3	15.7	5	15.98	11	59.9	27
15.0	29.52	1	23.7	12	5.86	24	22.0	34	25.45	3	15.2	5	15.92	6	56.9	30
25.0	29.59	7	22.2	15	5.72	14	18.3	37	25.53	8	14.8	4	15.92	0	53.6	33
c. 5.0	29.70	11	20.6	16	5.70	2	14.5	38	25.66	13	14.6	2	15.98	6	50.2	34
15.0	29.86	16	18.8	18	5.80	10	10.7	38	25.85	19	14.5	1	16.10	12	46.7	35
24.9	30.06	20	16.9	19	6.02	22	7.0	37	26.09	24	14.7	2	16.28	18	43.3	34
34.9	30.30	24	15.0	19	6.35	33	3.5	35	26.37	28	15.0	3	16.52	24	39.9	34
I, Tan δ	1.001		+0.038		2.784		+2.599		1.133		−0.533		1.359		+0.920	
n Place	28ˢ.435		33″.06		8ˢ.974		30″.77		24ˢ.094		3″.34		15ˢ.948		64″.49	
ı, $D_{\infty}\alpha$	0.00		0.00		−0.06		+0.07		+0.01		−0.01		−0.02		+0.02	
, $D_{\infty}\delta$	−0.2		−0.9		−0.2		−0.9		−0.2		−0.9		−0.2		−0.9	

APPARENT PLACES OF STARS, 1912.

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	**ζ Ophiuchi.** Mag. 2.7				**24 Scorpii.** Mag. 5.0				**ζ Herculis.** Mag. 3.0				**α Triang. Aust.** Mag. 1.9			
	Right Ascension.		Declination S.		Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination S.	
	h m 16 32		° ′ −10 23		h m 16 36		° ′ −17 34		h m 16 37		° ′ +31 45		h m 16 39		° ′ −68 51	
	s		″		s		″		s		″		s		″	
Jan. 0.9	16.99		27.9		27.10		25.5		56.50		29.4		15.48		60.2	
10.9	17.26	27	29.2	13	27.37	27	26.4	9	56.74	24	26.4	30	16.08	60	58.6	16
20.9	17.55	29	30.6	14	27.67	30	27.4	10	57.02	28	23.7	27	16.76	68	57.3	13
30.8	17.86	31	31.9	13	27.99	32	28.4	10	57.33	31	21.3	24	17.50	74	56.5	8
Feb. 9.8	18.18	32	33.1	12	28.32	33	29.4	10	57.66	33	19.3	20	18.27	77	56.0	5
19.8	18.50	32	34.2	11	28.65	33	30.4	10	57.99	33	17.9	14	19.06	79	56.0	0
29.8	18.82	32	35.1	9	28.98	33	31.2	8	58.32	33	17.0	9	19.85	79	56.5	5
Mar. 10.7	19.13	31	35.8	7	29.30	32	32.0	8	58.65	33	16.7	3	20.64	79	57.3	8
20.7	19.43	30	36.3	5	29.61	31	32.6	6	58.97	32	16.9	2	21.40	76	58.4	11
30.7	19.71	28	36.6	3	29.91	30	33.1	5	59.27	30	17.7	8	22.13	73	59.9	15
Apr. 9.6	19.98	27	36.7	1	30.19	28	33.5	4	59.54	27	18.9	12	22.81	68	61.7	18
19.6	20.23	25	36.7	0	30.45	26	33.7	2	59.79	25	20.6	17	23.43	62	63.7	20
29.6	20.45	22	36.5	2	30.68	23	33.8	1	60.01	22	22.6	20	23.99	56	66.0	23
May 9.6	20.65	20	36.2	3	30.89	21	33.9	1	60.19	18	24.9	23	24.47	48	68.5	25
19.5	20.82	17	35.8	4	31.08	19	33.8	1	60.34	15	27.4	25	24.87	40	71.0	25
29.5	20.96	14	35.3	5	31.23	15	33.8	0	60.45	11	30.0	26	25.18	31	73.7	27
June 8.5	21.07	11	34.8	5	31.35	12	33.7	1	60.53	8	32.6	26	25.40	22	76.3	26
18.5	21.14	7	34.3	5	31.43	8	33.6	1	60.56	3	35.1	25	25.52	12	78.9	26
28.4	21.18	4	33.8	5	31.47	4	33.5	1	60.55	1	37.5	24	25.54	2	81.4	25
July 8.4	21.18	0	33.3	5	31.48	1	33.4	1	60.50	5	39.6	21	25.45	9	83.7	23
18.4	21.15	3	32.9	4	31.45	3	33.2	2	60.41	9	41.5	19	25.27	18	85.8	21
28.3	21.08	7	32.5	4	31.38	7	33.1	1	60.29	12	43.1	16	25.00	27	87.6	18
Aug. 7.3	20.98	10	32.1	4	31.28	10	33.0	1	60.14	15	44.4	13	24.65	35	89.0	14
17.3	20.86	12	31.8	3	31.16	12	32.8	2	59.96	18	45.3	9	24.24	41	90.0	10
27.3	20.72	14	31.6	2	31.02	14	32.6	2	59.76	20	45.8	5	23.78	46	90.5	5
Sept. 6.2	20.57	15	31.4	2	30.86	16	32.4	2	59.55	21	45.8	0	23.29	49	90.6	1
16.2	20.41	16	31.2	2	30.70	16	32.2	2	59.33	22	45.5	3	22.80	49	90.2	4
26.2	20.26	15	31.2	0	30.55	15	32.0	2	59.12	21	44.8	7	22.32	48	89.3	9
Oct. 6.2	20.13	13	31.2	0	30.41	14	31.9	1	58.93	19	43.6	12	21.89	43	88.0	13
16.1	20.02	11	31.3	1	30.30	11	31.8	1	58.76	17	42.1	15	21.53	36	86.3	17
26.1	19.95	7	31.5	2	30.22	8	31.7	1	58.63	13	40.2	19	21.26	27	84.2	21
Nov. 5.1	19.92	3	31.9	4	30.19	3	31.6	1	58.54	9	37.9	23	21.09	17	81.9	23
15.0	19.94	2	32.5	6	30.20	1	31.7	1	58.50	4	35.3	26	21.04	5	79.4	25
25.0	20.00	6	33.2	7	30.27	7	32.0	3	58.52	2	32.4	29	21.11	7	76.9	25
Dec. 5.0	20.12	12	34.1	9	30.39	12	32.4	4	58.59	7	29.4	30	21.32	21	74.4	25
15.0	20.29	17	35.1	10	30.56	17	33.0	6	58.71	12	26.3	31	21.65	33	72.0	24
24.9	20.50	21	36.2	11	30.77	21	33.7	7	58.88	17	23.1	32	22.10	45	69.9	21
34.9	20.74	24	37.5	13	31.03	26	34.5	8	59.11	23	20.0	31	22.65	55	68.0	19
Sec δ, Tan δ	1.016		−0.183		1.049		−0.316		1.176		+0.619		2.774		−2.588	
Mean Place	18ˢ.691		22″.42		28ˢ.887		21″.12		58ˢ.111		42″.01		20ˢ.140		62″.78	
D′ψ α, Dω α	0.00		0.00		+0.01		−0.01		−0.02		+0.01		+0.06		−0.06	
Dψ δ, Dω δ	−0.1		−0.9		−0.1		−0.9		−0.1		−0.9		−0.1		−0.9	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	**η Herculis.** Mag. 3.6				**Groombridge 2377.** Mag. 4.9				**ε Scorpii.** Mag. 2.4				**49 Herculis.** Mag. 6.4			
	Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination N.	
	h m 16 39		° ′ +39 4		h m 16 43		° ′ +56 55		h m 16 44		° ′ −34 8		h m 16 48		° ′ +15 6	
	s		″		s		″		s		″		s		″	
Jan. 0.9	51.02		67.0		35.55		64.9		25.50		6.1		2.82		65.9	
10.9	51.27	25	63.8	32	35.84	29	61.4	35	25.80	30	6.1	0	3.06	24	63.5	24
20.9	51.56	29	60.9	29	36.18	34	58.3	31	26.13	33	6.2	1	3.33	27	61.2	23
30.8	51.88	32	58.4	25	36.58	40	55.7	26	26.49	36	6.6	4	3.62	29	59.1	21
Feb. 9.8	52.22	34	56.4	20	37.01	43	53.6	21	26.86	37	7.1	5	3.92	30	57.4	17
		35		15		45		15		38		6		31		14
19.8	52.57		54.9		37.46		52.1		27.24		7.7		4.23		56.0	
29.8	52.93	36	54.0	9	37.93	47	51.3	8	27.62	38	8.4	7	4.54	31	55.0	10
Mar. 10.7	53.28	35	53.7	3	38.39	46	51.1	2	27.98	36	9.2	8	4.84	30	54.5	5
20.7	53.62	34	54.0	3	38.83	44	51.6	5	28.34	36	10.0	8	5.14	30	54.4	1
30.7	53.94	32	54.9	9	39.25	42	52.8	12	28.69	35	10.8	8	5.42	28	54.8	4
		29		14		38		17		33		8		27		7
Apr. 9.6	54.23		56.3		39.63		54.5		29.02		11.6		5.69		55.5	
19.6	54.49	26	58.2	19	39.96	33	56.7	22	29.32	30	12.5	9	5.94	25	56.6	11
29.6	54.72	23	60.4	22	40.25	29	59.3	26	29.59	27	13.4	9	6.16	22	58.0	14
May 9.6	54.92	20	63.0	26	40.47	22	62.2	29	29.84	25	14.3	9	6.35	19	59.7	17
19.5	55.07	15	65.7	27	40.63	16	65.3	31	30.06	22	15.2	9	6.52	17	61.5	18
		11		28		10		31		17		9		13		19
29.5	55.18		68.5		40.73		68.4		30.23		16.1		6.65		63.4	
June 8.5	55.24	6	71.3	28	40.77	4	71.6	32	30.38	15	16.9	8	6.75	10	65.3	19
18.5	55.26	2	74.0	27	40.74	3	74.7	31	30.48	10	17.7	8	6.82	7	67.2	19
28.4	55.24	2	76.6	26	40.64	10	77.6	29	30.53	5	18.5	8	6.85	3	69.0	18
July 8.4	55.17	7	78.9	23	40.48	16	80.2	26	30.54	1	19.3	8	6.84	1	70.6	16
		11		20		21		23		3		6		5		15
18.4	55.06		80.9		40.27		82.5		30.51		19.9		6.79		72.1	
28.3	54.92	14	82.6	17	40.01	26	84.4	19	30.44	7	20.5	6	6.72	7	73.4	13
Aug. 7.3	54.74	18	84.0	14	39.70	31	85.8	14	30.33	11	20.9	4	6.61	11	74.4	10
17.3	54.53	21	84.9	9	39.36	34	86.8	10	30.19	14	21.1	2	6.47	14	75.2	8
27.3	54.30	23	85.4	5	38.99	37	87.3	5	30.02	17	21.2	1	6.31	16	75.7	5
		24		0		39		0		19		1		17		2
Sept. 6.2	54.06		85.4		38.60		87.3		29.83		21.1		6.14		75.9	
16.2	53.82	24	85.0	4	38.21	39	86.8	5	29.64	19	20.9	2	5.97	17	75.8	1
26.2	53.58	24	84.2	8	37.83	38	85.7	11	29.45	19	20.4	5	5.80	17	75.4	4
Oct. 6.2	53.36	22	82.9	13	37.48	35	84.2	15	29.29	16	19.8	6	5.64	16	74.7	7
16.1	53.17	19	81.2	17	37.16	32	82.2	20	29.15	14	19.1	7	5.50	14	73.7	10
		16		22		28		25		9		8		10		13
26.1	53.01		79.0		36.88		79.7		29.06		18.3		5.40		72.4	
Nov. 5.1	52.90	11	76.5	25	36.66	22	76.8	29	29.01	5	17.5	8	5.34	6	70.8	16
15.0	52.84	6	73.7	28	36.51	15	73.6	32	29.01	0	16.7	8	5.32	2	69.0	18
25.0	52.83	1	70.6	31	36.44	7	70.1	35	29.08	7	15.9	8	5.35	3	66.9	21
Dec. 5.0	52.89	6	67.3	33	36.44	0	66.5	36	29.20	12	15.3	6	5.42	7	64.6	23
		12		34		9		37		18		5		13		24
15.0	53.01		63.9		36.53		62.8		29.38		14.8		5.55		62.2	
24.9	53.18	17	60.5	34	36.70	17	59.1	37	29.62	24	14.5	3	5.72	17	59.8	24
34.9	53.40	22	57.3	32	36.94	24	55.5	36	29.90	28	14.3	2	5.94	22	57.3	25
Sec δ, Tan δ	1.289		+0.813		1.832		+1.535		1.208		−0.678		1.036		+0.270	
Mean Place	$52^{s}.705$		80″.53		$37^{s}.660$		79″.96		$27^{s}.630$		4″.02		$4^{s}.432$		76″.05	
$D'_{\psi}\,\alpha$, $D_{\omega}\,\alpha$	−0.02		+0.02		−0.04		+0.03		+0.02		−0.01		−0.01		+0.01	
$D_{\psi}\,\delta$, $D_{\omega}\,\delta$	−0.1		−0.9		−0.1		−0.9		−0.1		−0.9		−0.1		−1.0	

Mean Solar Date.	**ε^1 Arae.** Mag 4.2				**κ Ophiuchi.** Mag. 3.4				**30 Ophiuchi.** Mag. 5.0				**ε Herculis.** Mag. 3.9			
	Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination N.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	16 52		−53 1		16 53		+ 9 30		16 56		− 4 5		16 56		+31 2	
	s		″		s		″		s		″		s		″	
Jan. 0.9	30.97		35.0		28.49		30.8		23.48		36.1		53.64		67.2	
10.9	31.36	39	34.0	10	28.72	23	28.6	22	23.72	24	37.6	15	53.87	23	64.2	30
20.9	31.79	43	33.2	8	28.98	26	26.5	21	23.99	27	39.2	16	54.13	26	61.4	28
30.8	32.25	46	32.8	4	29.27	29	24.6	19	24.28	29	40.6	14	54.43	30	59.0	24
Feb. 9.8	32.73	48	32.6	2	29.57	30	23.0	16	24.58	30	41.9	13	54.74	31	57.0	20
19.8	33.23	50	32.7	1	29.87	30	21.7	13	24.89	31	43.0	11	55.07	33	55.4	16
29.8	33.73	50	33.1	4	30.18	31	20.7	10	25.20	31	43.8	8	55.40	33	54.3	11
Mar. 10.7	34.23	50	33.7	6	30.48	30	20.1	6	25.51	31	44.4	6	55.73	33	53.9	4
20.7	34.71	48	34.6	9	30.78	30	20.0	1	25.81	30	44.8	4	56.05	32	54.0	1
30.7	35.18	47	35.7	11	31.06	28	20.2	2	26.10	29	44.9	1	56.35	30	54.6	6
Apr. 9.7	35.62	44	37.0	13	31.33	27	20.8	6	26.37	27	44.7	2	56.64	29	55.8	12
19.6	36.03	41	38.4	14	31.58	25	21.7	9	26.63	26	44.3	4	56.90	26	57.3	15
29.6	36.41	38	40.0	16	31.80	22	22.8	11	26.87	24	43.7	6	57.14	24	59.3	20
May 9.6	36.74	33	41.7	17	32.00	20	24.2	14	27.08	21	43.0	7	57.34	20	61.6	23
19.5	37.04	30	43.5	18	32.17	17	25.8	16	27.26	18	42.1	9	57.51	17	64.0	24
29.5	37.28	24	45.4	19	32.31	14	27.4	16	27.42	16	41.2	9	57.64	13	66.6	26
June 8.5	37.46	18	47.3	19	32.42	11	29.1	17	27.54	12	40.3	9	57.74	10	69.2	26
18.5	37.59	13	49.1	18	32.50	8	30.7	16	27.64	10	39.3	10	57.79	5	71.8	26
28.4	37.66	7	50.9	18	32.54	4	32.2	15	27.69	5	38.4	9	57.80	1	74.2	24
July 8.4	37.66	0	52.6	17	32.54	0	33.7	15	27.71	2	37.6	8	57.77	3	76.4	22
18.4	37.60	6	54.1	15	32.51	3	35.0	13	27.69	2	36.9	7	57.70	7	78.4	20
28.4	37.49	11	55.4	13	32.44	7	36.1	11	27.64	5	36.2	7	57.60	10	80.2	18
Aug. 7.3	37.32	17	56.5	11	32.35	9	37.0	9	27.55	9	35.7	5	57.45	15	81.6	14
17.3	37.11	21	57.3	8	32.22	13	37.7	7	27.44	11	35.3	4	57.28	17	82.6	10
27.3	36.87	24	57.7	4	32.07	15	38.2	5	27.30	14	34.9	4	57.09	19	83.3	7
Sept. 6.2	36.60	27	57.8	1	31.91	16	38.4	2	27.15	15	34.7	2	56.88	21	83.5	2
16.2	36.32	28	57.5	3	31.74	17	38.4	0	26.99	16	34.6	1	56.66	22	83.4	1
26.2	36.05	27	56.9	6	31.57	17	38.2	2	26.83	16	34.7	1	56.45	21	82.8	6
Oct. 6.2	35.81	24	56.0	9	31.42	15	37.6	6	26.68	15	34.9	2	56.25	20	81.8	10
16.1	35.60	21	54.8	12	31.29	13	36.8	8	26.56	12	35.2	3	56.08	17	80.5	13
26.1	35.44	16	53.3	15	31.19	10	35.8	10	26.47	9	35.7	5	55.94	14	78.7	18
Nov. 5.1	35.35	9	51.6	17	31.13	6	34.5	13	26.42	5	36.4	7	55.83	11	76.6	21
15.1	35.33	2	49.8	18	31.11	2	32.9	16	26.41	1	37.2	8	55.77	6	74.2	24
25.0	35.38	5	48.0	18	31.14	3	31.1	18	26.44	3	38.2	10	55.76	1	71.4	28
Dec. 5.0	35.52	14	46.3	17	31.22	8	29.2	19	26.53	9	39.4	12	55.81	5	68.4	30
15.0	35.74	22	44.7	16	31.34	12	27.1	21	26.67	14	40.8	14	55.92	11	65.4	30
24.9	36.02	28	43.2	15	31.51	17	24.9	22	26.85	18	42.2	14	56.07	15	62.3	31
34.9	36.37	35	41.9	13	31.72	21	22.7	22	27.07	22	43.7	15	56.27	20	59.2	31
Sec δ, Tan δ	1.663		−1.328		1.014		+0.167		1.003		−0.072		1.168		+0.602	
Mean Place	$33^{s}.893$		34″.89		$30^{s}.124$		40″.08		$25^{s}.185$		28″.80		$55^{s}.332$		79″.39	
$D'_{\psi}\alpha$, $D_{\omega}\alpha$	+0.03		−0.03		0.00		0.00		0.00		0.00		−0.02		+0.01	
$D_{\psi}\delta$, $D_{\omega}\delta$	−0.1		−1.0		−0.1		−1.0		−0.1		−1.0		−0.1		−1.0	

Mean Solar Date.	***d* Herculis.** Mag. 5.3				**η Ophiuchi.** Mag. 2.6				**η Scorpii.** Mag. 3.4				**ζ Draconis.** Mag. 3.2			
	Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination S.		Right Ascension.		Declination N.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	16 58		+33 41		17 5		−15 37		17 5		−43 7		17 8		+65 48	
	s		″		s		″		s		″		s		″	
Jan. 0.9	19.64		29.7		17.93		6.0		48.41		29.6		28.94		68.2	
10.9	19.87	23	26.6	31	18.18	25	6.9	9	48.72	31	29.0	6	29.22	28	64.6	36
20.9	20.13	26	23.8	28	18.45	27	7.8	9	49.07	35	28.5	5	29.59	37	61.4	32
30.9	20.42	29	21.3	25	18.75	30	8.8	10	49.46	39	28.3	2	30.03	44	58.6	28
Feb. 9.8	20.74	32	19.2	21	19.07	32	9.7	9	49.86	40	28.3	0	30.53	50	56.2	24
19.8	21.07	33	17.6	16	19.39	32	10.5	8	50.28	42	28.4	1	31.08	55	54.5	17
29.8	21.41	34	16.6	10	19.72	33	11.2	7	50.70	42	28.8	4	31.66	58	53.4	11
Mar. 10.7	21.75	34	16.1	5	20.04	32	11.8	6	51.12	42	29.3	5	32.24	58	53.0	4
20.7	22.07	32	16.2	1	20.35	31	12.2	4	51.53	41	29.9	6	32.81	57	53.3	3
30.7	22.38	31	16.9	7	20.66	31	12.5	3	51.93	40	30.7	8	33.36	55	54.3	10
Apr. 9.7	22.67	29	18.1	12	20.95	29	12.6	1	52.31	38	31.6	9	33.87	51	55.8	15
19.6	22.94	27	19.7	16	21.22	27	12.6	0	52.67	36	32.6	10	34.32	45	57.9	21
29.6	23.18	24	21.8	21	21.48	26	12.4	2	53.00	33	33.7	11	34.71	39	60.4	25
May 9.6	23.39	21	24.1	23	21.71	23	12.2	2	53.30	30	34.8	11	35.02	31	63.3	29
19.6	23.56	17	26.6	25	21.92	21	12.0	2	53.57	27	36.0	12	35.25	23	66.4	31
29.5	23.70	14	29.3	27	22.09	17	11.7	3	53.80	23	37.3	13	35.39	14	69.7	33
June 8.5	23.79	9	32.0	27	22.24	15	11.4	3	53.98	18	38.6	13	35.44	5	73.0	33
18.5	23.84	5	34.7	27	22.35	11	11.1	3	54.11	13	40.0	14	35.40	4	76.2	32
28.4	23.85	1	37.2	25	22.42	7	10.8	3	54.20	9	41.3	13	35.28	12	79.3	31
July 8.4	23.81	4	39.5	23	22.45	3	10.6	2	54.23	3	42.5	12	35.07	21	82.2	29
18.4	23.74	7	41.6	21	22.44	1	10.4	2	54.21	2	43.6	11	34.78	29	84.7	25
28.4	23.62	12	43.4	18	22.40	4	10.2	2	54.14	7	44.6	10	34.42	36	86.9	22
Aug. 7.3	23.47	15	44.8	14	22.32	8	10.0	2	54.02	12	45.4	8	33.99	43	88.7	18
17.3	23.29	18	45.9	11	22.20	12	9.8	2	53.87	15	46.0	6	33.51	48	90.0	13
27.3	23.09	20	46.5	6	22.06	14	9.6	2	53.68	19	46.4	4	32.99	52	90.8	8
Sept. 6.3	22.87	22	46.8	3	21.91	15	9.5	1	53.47	21	46.5	1	32.45	54	91.1	3
16.2	22.65	22	46.7	1	21.75	16	9.4	1	53.25	22	46.4	1	31.90	55	90.9	2
26.2	22.43	22	46.1	6	21.59	16	9.3	1	53.03	22	46.0	4	31.35	55	90.1	8
Oct. 6.2	22.22	21	45.1	10	21.44	15	9.2	1	52.83	20	45.4	6	30.82	53	88.9	12
16.1	22.03	19	43.7	14	21.31	13	9.2	0	52.66	17	44.6	8	30.32	50	87.1	18
26.1	21.88	15	41.8	19	21.22	9	9.2	0	52.52	14	43.5	11	29.88	44	84.8	23
Nov. 5.1	21.77	11	39.6	22	21.16	6	9.3	1	52.44	8	42.3	12	29.51	37	82.2	26
15.1	21.70	7	37.1	25	21.15	1	9.5	2	52.42	2	41.1	12	29.22	29	79.1	31
25.0	21.69	1	34.3	28	21.19	4	9.8	3	52.46	4	39.8	13	29.02	20	75.7	34
Dec. 5.0	21.73	4	31.3	30	21.28	9	10.3	5	52.57	11	38.6	12	28.92	10	72.1	36
15.0	21.83	10	28.1	32	21.42	14	10.9	6	52.74	17	37.5	11	28.92	0	68.4	37
25.0	21.98	15	24.9	32	21.60	18	11.6	7	52.97	23	36.5	10	29.03	11	64.7	37
34.9	22.18	20	21.8	31	21.82	22	12.4	8	53.26	29	35.7	8	29.25	22	61.0	37
Sec δ, Tan δ	1.202		+0.667		1.039		−0.279		1.370		−0.937		2.442		+2.228	
Mean Place	$21^{s}.356$		42″.13		$19^{s}.763$		0″.08		$50^{s}.859$		27″.23		$31^{s}.799$		82″.50	
$D'_{\psi}\alpha$, $D_{\omega}\alpha$	−0.02		+0.01		+0.01		0.00		+0.02		−0.01		−0.06		+0.03	
$D_{\psi}\delta$, $D_{\omega}\delta$	*−0.1*		*−1.0*		−0.1		−1.0		−0.1		−1.0		−0.1		−1.0	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	**α Herculis.** Var. 3.1–3.9				**δ Herculis.** Mag. 3.2				**π Herculis.** Mag. 3.4				**59 Apodis (G.).** Mag. 5.9			
	Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination S.	
	h m 17 10		° ′ +14 29		h m 17 11		° ′ +24 56		h m 17 11		° ′ +36 54		h m 17 14		° ′ −80 46	
	s		″		s		″		s		″		s		″	
Jan. 0.9	36.38		13.6		23.28		21.2		57.06		15.6		48.91		47.1	
10.9	36.60	22	11.2	24	23.49	21	18.4	28	57.28	22	12.4	32	49.97	106	44.7	24
20.9	36.85	25	9.0	22	23.74	25	15.8	26	57.53	25	9.4	30	51.23	126	42.6	21
30.9	37.12	27	7.0	20	24.01	27	13.4	24	57.82	29	6.8	26	52.66	143	41.0	16
Feb. 9.8	37.41	29	5.2	18	24.31	30	11.4	20	58.14	32	4.6	22	54.22	156	39.7	13
19.8	37.71	30	3.8	14	24.62	31	9.8	16	58.47	33	2.9	17	55.86	164	38.9	8
29.8	38.02	31	2.8	10	24.93	31	8.7	11	58.81	34	1.8	11	57.56	170	38.6	3
Mar. 10.7	38.32	30	2.2	6	25.25	32	8.2	5	59.15	34	1.3	5	59.27	171	38.8	2
20.7	38.62	30	2.1	1	25.56	31	8.1	1	59.49	34	1.3	0	60.97	170	39.4	6
30.7	38.91	29	2.4	3	25.86	30	8.6	5	59.82	33	1.9	6	62.62	165	40.4	10
Apr. 9.7	39.19	28	3.1	7	26.15	29	9.5	9	60.13	31	3.1	12	64.18	156	41.8	14
19.6	39.45	26	4.1	10	26.42	27	10.9	14	60.41	28	4.8	17	65.64	146	43.6	18
29.6	39.69	24	5.5	14	26.66	24	12.6	17	60.67	26	6.8	20	66.97	133	45.8	22
May 9.6	39.90	21	7.2	17	26.87	21	14.7	21	60.89	22	9.2	24	68.14	117	48.2	24
19.6	40.09	19	9.0	18	27.06	19	16.9	22	61.07	18	11.9	27	69.13	99	50.8	26
29.5	40.24	15	10.9	19	27.21	15	19.3	24	61.22	15	14.7	28	69.92	79	53.7	29
June 8.5	40.36	12	12.8	19	27.32	11	21.7	24	61.33	11	17.5	28	70.50	58	56.6	29
18.5	40.45	9	14.7	19	27.40	8	24.0	23	61.39	6	20.3	28	70.85	35	59.6	30
28.4	40.50	5	16.6	19	27.43	3	26.3	23	61.40	1	23.0	27	70.96	11	62.6	30
July 8.4	40.51	1	18.3	17	27.43	0	28.5	22	61.37	3	25.5	25	70.85	11	65.4	28
18.4	40.49	2	19.9	16	27.38	5	30.4	19	61.30	7	27.8	23	70.50	35	68.1	27
28.4	40.42	7	21.3	14	27.30	8	32.1	17	61.18	12	29.7	19	69.93	57	70.5	24
Aug. 7.3	40.32	10	22.4	11	27.19	11	33.5	14	61.03	15	31.3	16	69.17	76	72.5	20
17.3	40.20	12	23.3	9	27.04	15	34.5	10	60.84	19	32.6	13	68.24	93	74.1	16
27.3	40.05	15	23.9	6	26.87	17	35.3	8	60.63	21	33.4	8	67.18	106	75.3	12
Sept. 6.3	39.88	17	24.2	3	26.68	19	35.7	4	60.40	23	33.8	4	66.03	115	75.9	6
16.2	39.71	17	24.3	1	26.48	20	35.7	0	60.16	24	33.8	0	64.83	120	76.0	1
26.2	39.53	18	24.1	2	26.28	20	35.3	4	59.92	24	33.3	5	63.64	119	75.5	5
Oct. 6.2	39.37	16	23.5	6	26.09	19	34.6	7	59.69	23	32.4	9	62.52	112	74.4	11
16.1	39.22	15	22.6	9	25.92	17	33.5	11	59.48	21	31.0	14	61.50	102	72.9	15
26.1	39.10	12	21.5	11	25.78	14	32.0	15	59.31	17	29.2	18	60.64	86	70.9	20
Nov. 5.1	39.02	8	20.0	15	25.68	10	30.1	19	59.17	14	27.0	22	59.99	65	68.5	24
15.1	38.98	4	18.3	17	25.63	5	28.0	21	59.08	9	24.5	25	59.58	41	65.8	27
25.0	38.99	1	16.4	19	25.62	1	25.6	24	59.05	3	21.7	28	59.43	15	62.9	29
Dec. 5.0	39.05	6	14.2	22	25.66	4	22.9	27	59.07	2	18.6	31	59.56	13	59.9	30
15.0	39.15	10	11.9	23	25.75	9	20.1	28	59.15	8	15.4	32	59.97	41	56.9	30
25.0	39.30	15	9.5	24	25.89	14	17.3	28	59.28	13	12.1	33	60.64	67	54.1	28
34.9	39.49	19	7.1	24	26.08	19	14.4	29	59.46	18	8.9	32	61.56	92	51.4	27
Sec δ, Tan δ	1.033		+0.259		1.103		+0.465		1.250		+0.751		6.242		−6.162	
Mean Place	38ˢ.058		23″.69		24ˢ.980		32″.44		58ˢ.874		27″.96		59ˢ.090		47″.01	
$D'_\psi \alpha$, $D_\omega \alpha$	−0.01		0.00		−0.01		+0.01		−0.02		+0.01		+0.16		−0.08	
$D_\psi \delta$, $D_\omega \delta$	−0.1		−1.0		−0.1		−1.0		−0.1		−1.0		−0.1		−1.0	

Mean Solar Date.	θ Ophiuchi. Mag. 3.4				ω Herculis. Mag. 5.4				β Aræ. Mag. 2.8				b Ophiuchi. Mag. 4.3			
	Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination S.	
	h m 17 16		° ′ −24 54		h m 17 17		° ′ +32 34		h m 17 17		° ′ −55 26		h m 17 20		° ′ −24 5	
	s		″		s		″		s		″		s		″	
Jan. 0.9	34.23		50.5		20.17		37.2		55.81		53.6		57.67		48.7	
10.9	34.48	25	50.7	2	20.38	21	34.1	31	56.17	36	52.2	14	57.91	24	49.0	3
20.9	34.76	28	51.1	4	20.62	24	31.2	29	56.59	42	51.0	12	58.19	28	49.4	4
30.9	35.07	31	51.6	5	20.90	28	28.6	26	57.05	46	50.2	8	58.50	31	49.9	5
Feb. 9.8	35.40	33	52.1	5	21.20	30	26.4	22	57.55	50	49.6	6	58.82	32	50.4	5
19.8	35.74	34	52.6	5	21.52	32	24.7	17	58.06	51	49.3	3	59.16	34	50.9	5
29.8	36.08	34	53.1	5	21.85	33	23.5	12	58.58	52	49.3	0	59.50	34	51.4	5
Mar. 10.8	36.43	35	53.6	5	22.18	33	22.9	6	59.11	53	49.6	3	59.84	34	51.8	4
20.7	36.76	33	54.0	4	22.51	33	22.9	0	59.63	52	50.1	5	60.17	33	52.2	4
30.7	37.09	33	54.3	3	22.83	32	23.4	5	60.14	51	50.8	7	60.50	33	52.5	3
Apr. 9.7	37.41	32	54.6	3	23.13	30	24.4	10	60.63	49	51.9	11	60.82	32	52.7	2
19.6	37.71	30	54.9	3	23.41	28	25.9	15	61.09	46	53.1	12	61.12	30	52.9	2
29.6	37.99	28	55.1	2	23.66	25	27.8	19	61.52	43	54.5	14	61.40	28	53.1	2
May 9.6	38.25	26	55.3	2	23.89	23	30.0	22	61.91	39	56.1	16	61.66	26	53.3	2
19.6	38.48	23	55.5	2	24.08	19	32.5	25	62.25	34	57.8	17	61.89	23	53.4	1
29.5	38.68	20	55.7	2	24.23	15	35.1	26	62.54	29	59.6	18	62.09	20	53.5	1
June 8.5	38.84	16	55.9	2	24.35	12	37.8	27	62.77	23	61.5	19	62.26	17	53.7	2
18.5	38.97	13	56.2	3	24.42	7	40.5	27	62.94	17	63.4	19	62.39	13	53.8	1
28.5	39.06	9	56.4	2	24.45	3	43.0	25	63.05	11	65.3	19	62.48	9	54.0	2
July 8.4	39.10	4	56.6	2	24.44	1	45.4	24	63.09	4	67.2	19	62.53	5	54.2	2
18.4	39.10	0	56.9	3	24.38	6	47.6	22	63.06	3	68.9	17	62.54	1	54.4	2
28.4	39.06	4	57.1	2	24.28	10	49.5	19	62.97	9	70.4	15	62.50	4	54.6	2
Aug. 7.3	38.99	7	57.3	2	24.15	13	51.1	16	62.81	16	71.8	14	62.43	7	54.8	2
17.3	38.87	12	57.4	1	23.98	17	52.3	12	62.61	20	72.8	10	62.32	11	54.9	1
27.3	38.73	14	57.5	1	23.79	19	53.1	8	62.36	25	73.5	7	62.18	14	55.0	1
Sept. 6.3	38.57	16	57.5	0	23.58	21	53.6	5	62.08	28	73.9	4	62.02	16	55.0	0
16.2	38.40	17	57.4	1	23.36	22	53.6	0	61.78	30	73.9	0	61.85	17	54.9	1
26.2	38.23	17	57.2	2	23.13	23	53.2	4	61.48	30	73.5	4	61.68	17	54.8	1
Oct. 6.2	38.07	16	57.0	2	22.92	21	52.3	9	61.20	28	72.8	7	61.52	16	54.6	2
16.2	37.93	14	56.7	3	22.73	19	51.1	12	60.96	24	71.7	11	61.38	14	54.3	3
26.1	37.82	11	56.4	3	22.56	17	49.4	17	60.76	20	70.4	13	61.27	11	54.1	2
Nov. 5.1	37.75	7	56.1	3	22.43	13	47.4	20	60.62	14	68.8	16	61.20	7	53.8	3
15.1	37.73	2	55.8	3	22.35	8	45.0	24	60.56	6	67.0	18	61.17	3	53.6	2
25.0	37.76	3	55.6	2	22.32	3	42.2	28	60.57	1	65.1	19	61.19	2	53.4	2
Dec. 5.0	37.84	8	55.4	2	22.34	2	39.3	29	60.67	10	63.2	19	61.27	8	53.3	1
15.0	37.97	13	55.3	1	22.42	8	36.2	31	60.85	18	61.3	19	61.40	13	53.3	0
25.0	38.16	19	55.4	1	22.55	13	33.1	31	61.11	26	59.5	18	61.58	18	53.4	1
34.9	38.39	23	55.6	2	22.73	18	30.0	31	61.44	33	58.0	15	61.81	23	53.6	2
Sec δ, Tan δ	1.102		−0.464		1.187		+0.639		1.764		−1.452		1.096		−0.447	
Mean Place	$36^{\mathrm{s}}.212$		45″.16		$21^{\mathrm{s}}.951$		49″.01		$58^{\mathrm{s}}.920$		51″.47		$59^{\mathrm{s}}.644$		43″.08	
D′ψ α, Dω α	+0.01		−0.01		−0.02		+0.01		+0.04		−0.02		+0.01		−0.01	
Dψ δ, Dω δ	−0.1		−1.0		−0.1		−1.0		−0.1		−1.0		−0.1		−1.0	

Mean Solar Date.	σ Ophiuchi. Mag. 4.4				δ Aræ. Mag. 3.8				α Aræ. Mag. 3.0				λ Herculis. Mag. 4.5			
	Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination S.		Right Ascension.		Declination N.	
	h m 17 22		° ' + 4 12		h m 17 23		° ' −60 36		h m 17 24		° ' −49 48		h m 17 27		° ' +26 10	
	s		"		s		"		s		"		s		"	
Jan. 0.9	7.16		49.4		5.45		44.7		59.44		29.9		9.14		23.9	
10.9	7.37	21	47.5	19	5.85	40	43.0	17	59.76	32	28.7	12	9.34	20	21.0	29
20.9	7.61	24	45.7	18	6.31	46	41.6	14	60.13	37	27.7	10	9.57	23	18.3	27
30.9	7.88	27	44.0	17	6.83	52	40.4	12	60.54	41	27.0	7	9.84	27	15.9	24
Feb. 9.8	8.16	28	42.5	15	7.39	56	39.6	8	60.98	44	26.5	5	10.13	29	13.8	21
19.8	8.46	30	41.3	12	7.97	58	39.1	5	61.43	45	26.3	2	10.43	30	12.2	16
29.8	8.76	30	40.4	9	8.56	59	38.9	2	61.90	47	26.3	0	10.74	31	11.0	12
Mar. 10.8	9.07	31	39.9	5	9.16	60	39.1	2	62.37	47	26.5	2	11.06	32	10.4	6
20.7	9.37	30	39.7	2	9.76	60	39.6	5	62.83	46	26.9	4	11.38	32	10.3	1
30.7	9.66	29	39.8	1	10.34	58	40.3	7	63.28	45	27.5	6	11.68	30	10.7	4
Apr. 9.7	9.94	28	40.2	4	10.89	55	41.4	11	63.72	44	28.3	8	11.98	30	11.6	9
19.6	10.21	27	41.0	8	11.42	53	42.7	13	64.14	42	29.3	10	12.25	27	13.0	14
29.6	10.46	25	42.0	10	11.91	49	44.2	15	64.53	39	30.4	11	12.51	26	14.7	17
May 9.6	10.68	22	43.2	12	12.36	45	45.9	17	64.89	36	31.7	13	12.74	23	16.7	20
19.6	10.88	20	44.5	13	12.75	39	47.8	19	65.21	32	33.1	14	12.94	20	19.0	23
29.5	11.06	18	45.9	14	13.08	33	49.8	20	65.48	27	34.6	15	13.10	16	21.5	25
June 8.5	11.20	14	47.4	15	13.35	27	51.9	21	65.70	22	36.2	16	13.23	13	24.0	25
18.5	11.31	11	48.9	15	13.55	20	54.1	22	65.87	17	37.8	16	13.32	9	26.5	25
28.5	11.38	7	50.3	14	13.67	12	56.2	21	65.99	12	39.4	16	13.37	5	28.9	24
July 8.4	11.41	3	51.6	13	13.71	4	58.3	21	66.04	5	41.0	16	13.38	1	31.2	23
18.4	11.40	1	52.8	12	13.67	4	60.3	20	66.03	1	42.5	15	13.34	4	33.2	20
28.4	11.36	4	53.9	11	13.56	11	62.1	18	65.96	7	43.9	14	13.27	7	35.0	18
Aug. 7.3	11.28	8	54.7	8	13.38	18	63.6	15	65.85	11	45.1	12	13.16	11	36.6	16
17.3	11.17	11	55.4	7	13.13	25	64.8	12	65.68	17	46.0	9	13.02	14	37.8	12
27.3	11.03	14	56.0	6	12.84	29	65.7	9	65.47	21	46.6	6	12.85	17	38.7	9
Sept. 6.3	10.88	15	56.3	3	12.51	33	66.2	5	65.23	24	47.0	4	12.66	19	39.2	5
16.2	10.72	16	56.4	1	12.16	35	66.3	1	64.98	25	47.1	1	12.45	21	39.4	2
26.2	10.55	17	56.3	1	11.81	35	66.0	3	64.72	26	46.8	3	12.25	20	39.1	3
Oct. 6.2	10.39	16	55.9	4	11.47	34	65.2	8	64.47	25	46.2	6	12.05	20	38.5	6
16.2	10.25	14	55.4	5	11.17	30	64.1	11	64.26	21	45.3	9	11.87	18	37.5	10
26.1	10.14	11	54.7	7	10.93	24	62.6	15	64.08	18	44.2	11	11.72	15	36.1	14
Nov. 5.1	10.06	8	53.7	10	10.76	17	60.9	17	63.96	12	42.8	14	11.60	12	34.3	18
15.1	10.02	4	52.5	12	10.66	10	58.9	20	63.91	5	41.3	15	11.53	7	32.2	21
25.0	10.03	1	51.1	14	10.66	0	56.8	21	63.92	1	39.7	16	11.51	2	29.9	23
Dec. 5.0	10.09	6	49.5	16	10.75	9	54.6	22	64.00	8	38.1	16	11.53	2	27.3	26
15.0	10.19	10	47.8	17	10.94	19	52.4	22	64.16	16	36.5	16	11.60	7	24.5	28
25.0	10.34	15	46.0	18	11.21	27	50.4	20	64.39	23	35.0	15	11.73	13	21.6	29
34.9	10.53	19	44.2	18	11.56	35	48.6	18	64.68	29	33.7	13	11.90	17	18.8	28
Sec δ, Tan δ	1.003		+0.074		2.038		−1.776		1.550		−1.184		1.114		+0.491	
Mean Place	$8^{\mathrm{s}}.875$		$58''.28$		$9^{\mathrm{s}}.009$		$42''.50$		$62^{\mathrm{s}}.209$		$26''.65$		$10^{\mathrm{s}}.902$		$34''.93$	
$D'_{\psi}\alpha$, $D_{\omega}\alpha$	0.00		0.00		+0.05		−0.02		+0.03		−0.01		−0.01		0.00	
$D_{\psi}\delta$, $D_{\omega}\delta$	−0.1		−1.0		−0.1		−1.0		−0.1		−1.0		−0.1		−1.0	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	λ Scorpii. Mag. 1.7				β Draconis. Mag. 3.0				α Ophiuchi. Mag. 2.1				ξ Serpentis. Mag. 3.6			
	Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension		Declination N.		Right Ascension.		Declination S.	
	h m 17 27		° ′ −37 2		h m 17 28		° ′ +52 21		h m 17 30		° ′ +12 37		h m 17 32		° ′ −15 20	
	s		″		s		″		s		″		s		″	
Jan. 1.0	35.61		30.1		24.39		45.4		49.21		14.1		30.91		44.9	
10.9	35.87	26	29.6	5	24.59	20	41.9	35	49.41	20	11.9	22	31.13	22	45.6	7
20.9	36.18	31	29.2	4	24.85	26	38.6	33	49.64	23	9.7	22	31.38	25	46.4	8
30.9	36.52	34	29.0	2	25.17	32	35.7	29	49.90	26	7.7	20	31.66	28	47.2	8
Feb. 9.8	36.89	37	29.0	0	25.53	36	33.2	25	50.18	28	6.0	17	31.96	30	48.0	8
19.8	37.26	37	29.1	1	25.91	38	31.3	19	50.47	29	4.6	14	32.27	31	48.6	6
29.8	37.64	38	29.3	2	26.32	41	30.0	13	50.77	30	3.6	10	32.59	32	49.2	6
Mar. 10.8	38.03	39	29.5	2	26.74	42	29.3	7	51.08	31	3.0	6	32.91	32	49.6	4
20.7	38.42	39	29.9	4	27.15	41	29.3	0	51.38	30	2.8	2	33.23	32	49.8	2
30.7	38.79	37	30.3	4	27.55	40	30.0	7	51.68	30	3.0	2	33.54	31	50.0	2
Apr. 9.7	39.15	36	30.8	5	27.94	39	31.2	12	51.96	28	3.6	6	33.85	31	49.9	1
19.7	39.50	35	31.4	6	28.29	35	33.0	18	52.23	27	4.6	10	34.14	29	49.8	1
29.6	39.82	32	32.0	6	28.61	32	35.3	23	52.48	25	5.9	13	34.41	27	49.5	3
May 9.6	40.12	30	32.7	7	28.88	27	38.0	27	52.71	23	7.5	16	34.67	26	49.1	4
19.6	40.39	27	33.4	7	29.10	22	40.9	29	52.92	21	9.2	17	34.90	23	48.7	4
29.5	40.63	24	34.3	9	29.27	17	44.0	31	53.09	17	11.1	19	35.10	20	48.3	4
June 8.5	40.83	20	35.2	9	29.38	11	47.2	32	53.23	14	13.0	19	35.27	17	47.9	4
18.5	40.98	15	36.1	9	29.43	5	50.4	32	53.34	11	14.9	19	35.40	13	47.5	4
28.5	41.08	10	37.0	9	29.42	1	53.5	31	53.41	7	16.8	19	35.50	10	47.2	3
July 8.4	41.14	6	37.9	9	29.35	7	56.5	30	53.44	3	18.5	17	35.55	5	46.9	3
18.4	41.15	1	38.7	8	29.22	13	59.2	27	53.44	0	20.1	16	35.56	1	46.6	3
28.4	41.11	4	39.5	8	29.04	18	61.5	23	53.39	5	21.5	14	35.54	2	46.4	2
Aug. 7.4	41.03	8	40.2	7	28.81	23	63.5	20	53.31	8	22.6	11	35.48	6	46.2	2
17.3	40.90	13	40.8	6	28.54	27	65.0	15	53.19	12	23.6	10	35.38	10	46.1	1
27.3	40.74	16	41.2	4	28.23	31	66.1	11	53.05	14	24.3	7	35.25	13	46.0	1
Sept. 6.3	40.56	18	41.4	2	27.90	33	66.7	6	52.89	16	24.7	4	35.10	15	45.9	1
16.2	40.36	20	41.4	0	27.56	34	66.9	2	52.72	17	24.8	1	34.94	16	45.8	1
26.2	40.16	20	41.2	2	27.21	35	66.5	4	52.54	18	24.7	1	34.77	17	45.8	0
Oct. 6.2	39.97	19	40.9	3	26.87	34	65.6	9	52.37	17	24.3	4	34.61	16	45.8	0
16.2	39.80	17	40.4	5	26.56	31	64.2	14	52.22	15	23.6	7	34.47	14	45.8	0
26.1	39.67	13	39.7	7	26.28	28	62.3	19	52.09	13	22.6	10	34.36	11	45.9	1
Nov. 5.1	39.58	9	38.8	9	26.04	24	60.0	23	52.00	9	21.3	13	34.28	8	46.0	1
15.1	39.54	4	37.8	10	25.86	18	57.3	27	51.94	6	19.8	15	34.25	3	46.2	2
25.1	39.55	1	36.9	9	25.74	12	54.2	31	51.93	1	18.0	18	34.26	1	46.5	3
Dec. 5.0	39.63	8	36.0	9	25.69	5	50.8	34	51.97	4	16.0	20	34.32	6	46.9	4
15.0	39.77	14	35.2	8	25.71	2	47.3	35	52.06	9	13.9	21	34.43	11	47.4	5
25.0	39.96	19	34.5	7	25.80	9	43.7	36	52.19	13	11.6	23	34.59	16	48.0	6
34.9	40.21	25	33.9	6	25.97	17	40.2	35	52.37	18	9.4	22	34.79	20	48.7	7
Sec δ, Tan δ	1.253		−0.755		1.638		+1.297		1.025		+0.224		1.037		−0.274	
Mean Place	$37^{s}.878$		$25''.43$		$26^{s}.622$		$58''.15$		$50^{s}.938$		$23''.97$		$32^{s}.777$		$37''.78$	
$D'_\psi\alpha$, $D_\omega\alpha$	+0.02		−0.01		−0.03		+0.01		−0.01		0.00		+0.01		0.00	
$D_\psi\delta$, $D_\omega\delta$	−0.1		−1.0		−0.1		−1.0		−0.1		−1.0		0.0		−1.0	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	**ι Herculis.** Mag. 3.8				**η Pavonis.** Mag. 3.6				**ω Draconis.** Mag. 4.9				**β Ophiuchi.** Mag. 2.9			
	Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination N.	
	h m 17 36		° +46 2		h m 17 37		° ′ −64 40		h m 17 37		° ′ +68 47		h m 17 39		° ′ + 4 35	
	s		″		s		″		s		″		s		″	
Jan. 1.0	56.77		57.8		1.48		61.9		24.45		42.6		5.75		63.0	
10.9	56.96	19	54.4	34	1.90	42	59.9	20	24.67	22	39.0	36	5.95	20	61.1	19
20.9	57.20	24	51.2	32	2.40	50	58.2	17	25.00	33	35.6	34	6.18	23	59.3	18
30.9	57.48	28	48.3	29	2.96	56	56.7	15	25.42	42	32.6	30	6.43	25	57.7	16
Feb. 9.8	57.80	32	45.8	25	3.57	61	55.6	11	25.93	51	30.1	25	6.71	28	56.2	15
19.8	58.15	35	43.9	19	4.22	65	54.8	8	26.50	57	28.1	20	7.00	29	55.0	12
29.8	58.52	37	42.5	14	4.88	66	54.4	4	27.12	62	26.7	14	7.30	30	54.1	9
Mar. 10.8	58.89	37	41.7	8	5.56	68	54.3	1	27.76	64	26.0	7	7.60	30	53.6	5
20.7	59.27	38	41.6	1	6.24	68	54.5	2	28.40	64	25.9	1	7.90	30	53.4	2
30.7	59.64	37	42.1	5	6.91	67	55.1	6	29.03	63	26.5	6	8.19	29	53.5	1
Apr. 9.7	59.99	35	43.2	11	7.55	64	56.0	9	29.63	60	27.8	13	8.48	29	54.0	5
19.7	60.32	33	44.9	17	8.17	62	57.2	12	30.17	54	29.6	18	8.76	28	54.8	8
29.6	60.62	30	47.1	22	8.74	57	58.6	14	30.64	47	31.9	23	9.01	25	55.9	11
May 9.6	60.88	26	49.6	25	9.26	52	60.3	17	31.04	40	34.6	27	9.25	24	57.1	12
19.6	61.10	22	52.4	28	9.73	47	62.2	19	31.35	31	37.7	31	9.47	22	58.5	14
29.5	61.28	18	55.4	30	10.13	40	64.3	21	31.56	21	40.9	32	9.65	18	60.0	15
June 8.5	61.41	13	58.5	31	10.45	32	66.6	23	31.67	11	44.3	34	9.81	16	61.6	16
18.5	61.48	7	61.6	31	10.69	24	68.9	23	31.68	1	47.6	33	9.93	12	63.1	15
28.5	61.50	2	64.7	31	10.85	16	71.2	23	31.59	9	50.8	32	10.02	9	64.6	15
July 8.4	61.47	3	67.6	29	10.91	6	73.5	23	31.40	19	53.9	31	10.06	4	66.0	14
18.4	61.39	8	70.2	26	10.88	3	75.7	22	31.11	29	56.7	28	10.07	1	67.3	13
28.4	61.26	13	72.5	23	10.77	11	77.7	20	30.73	38	59.2	25	10.04	3	68.4	11
Aug. 7.4	61.08	18	74.5	20	10.57	20	79.4	17	30.28	45	61.4	22	9.97	7	69.4	10
17.3	60.86	22	76.1	16	10.30	27	80.9	15	29.76	52	63.1	17	9.87	10	70.1	7
27.3	60.61	25	77.3	12	9.97	33	82.0	11	29.18	58	64.3	12	9.74	13	70.7	6
Sept. 6.3	60.33	28	78.0	7	9.59	38	82.7	7	28.56	62	65.1	8	9.59	15	71.1	4
16.2	60.04	29	78.2	2	9.18	41	83.0	3	27.92	64	65.3	2	9.42	17	71.2	1
26.2	59.74	30	78.0	2	8.76	42	82.8	2	27.27	65	65.0	3	9.25	17	71.2	0
Oct. 6.2	59.45	29	77.3	7	8.36	40	82.2	6	26.64	63	64.2	8	9.09	16	70.9	3
16.2	59.18	27	76.1	12	8.00	36	81.1	11	26.03	61	62.9	13	8.94	15	70.4	5
26.1	58.94	24	74.4	17	7.69	31	79.6	15	25.48	55	61.0	19	8.82	12	69.7	7
Nov. 5.1	58.74	20	72.3	21	7.46	23	77.8	18	24.99	49	58.7	23	8.73	9	68.8	9
15.1	58.59	15	69.7	26	7.31	15	75.8	20	24.58	41	55.9	28	8.68	5	67.6	12
25.1	58.49	10	66.8	29	7.26	5	73.5	23	24.27	31	52.8	31	8.67	1	66.3	13
Dec. 5.0	58.45	4	63.7	31	7.32	6	71.1	24	24.06	21	49.4	34	8.71	4	64.8	15
15.0	58.48	3	60.3	34	7.49	17	68.8	23	23.97	9	45.8	36	8.80	9	63.1	17
25.0	58.57	9	56.8	35	7.76	27	66.5	23	24.00	3	42.1	37	8.93	13	61.3	18
34.9	58.72	15	53.4	34	8.13	37	64.3	22	24.15	15	38.5	36	9.10	17	59.5	18
Sec δ, Tan δ	1.441		+1.037		2.339		−2.114		2.765		+2.578		1.003		+0.080	
Mean Place	58ˢ.859		69″.82		5ˢ.514		58″.77		27ˢ.911		55″.27		7ˢ.499		72″.08	
D′ψ α, Dω α	−0.03		+0.01		+0.05		−0.01		−0.07		+0.02		0.00		0.00	
Dψ δ, Dω δ	0.0		−1.0		0.0		−1.0		0.0		−1.0		0.0		−1.0	

FOR THE UPPER TRANSIT AT WASHINGTON.

ean Solar Date.	ι^1 Scorpii. Mag. 3.1				μ Herculis. Mag. 3.5				γ Ophiuchi. Mag. 3.7				ψ Draconis. Mag. 4.9			
	Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination N.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	17 41		−40 5		17 42		+27 45		17 43		+ 2 44		17 43		+72 11	
	s		″		s		″		s		″		s		″	
an. 1.0	23.41		43.0		59.02		66.7		27.02		13.9		25.97		20.0	
10.9	23.68	27	42.2	8	59.20	18	63.8	29	27.21	19	12.1	18	26.18	21	16.4	36
20.9	23.98	30	41.6	6	59.41	21	61.1	27	27.44	23	10.4	17	26.53	35	13.0	34
30.9	24.32	34	41.1	5	59.66	25	58.6	25	27.69	25	8.9	15	26.99	46	9.9	31
eb. 9.9	24.69	37	40.8	3	59.94	28	56.4	22	27.96	27	7.5	14	27.56	57	7.3	26
19.8	25.07	38	40.7	1	60.24	30	54.6	18	28.25	29	6.4	11	28.21	65	5.2	21
29.8	25.47	40	40.6	1	60.55	31	53.3	13	28.55	30	5.5	9	28.91	70	3.7	15
ar. 10.8	25.87	40	40.7	1	60.87	32	52.6	7	28.85	30	4.9	6	29.65	74	2.9	8
20.7	26.27	40	40.9	2	61.19	32	52.4	2	29.15	30	4.7	2	30.40	75	2.8	1
30.7	26.66	39	41.2	3	61.50	31	52.7	3	29.45	30	4.9	2	31.13	73	3.3	5
pr. 9.7	27.04	38	41.6	4	61.80	30	53.6	9	29.74	29	5.3	4	31.82	69	4.5	12
19.7	27.41	37	42.2	6	62.08	28	54.9	13	30.02	28	6.0	7	32.46	64	6.2	17
29.6	27.76	35	42.8	6	62.35	27	56.6	17	30.28	26	7.0	10	33.02	56	8.5	23
ay 9.6	28.08	32	43.5	7	62.60	25	58.6	20	30.52	24	8.2	12	33.48	46	11.2	27
19.6	28.38	30	44.3	8	62.81	21	60.9	23	30.74	22	9.6	14	33.84	36	14.2	30
29.6	28.64	26	45.2	9	62.99	18	63.4	25	30.93	19	11.0	14	34.09	25	17.4	32
ne 8.5	28.86	22	46.1	9	63.13	14	66.0	26	31.09	16	12.4	14	34.22	13	20.7	33
18.5	29.03	17	47.1	10	63.23	10	68.6	26	31.22	13	13.9	15	34.22	0	24.0	33
28.5	29.15	12	48.2	11	63.29	6	71.1	25	31.31	9	15.3	14	34.10	12	27.2	32
ly 8.4	29.23	8	49.3	11	63.31	2	73.5	24	31.36	5	16.6	13	33.86	24	30.3	31
18.4	29.25	2	50.3	10	63.29	2	75.7	22	31.37	1	17.8	12	33.51	35	33.2	29
28.4	29.22	3	51.3	10	63.23	6	77.6	19	31.35	2	18.8	10	33.06	45	35.7	25
ug. 7.4	29.14	8	52.2	9	63.12	11	79.3	17	31.28	7	19.7	9	32.52	54	37.9	22
17.3	29.02	12	52.9	7	62.98	14	80.6	13	31.18	10	20.5	8	31.89	63	39.6	17
27.3	28.86	16	53.5	6	62.81	17	81.6	10	31.06	12	21.0	5	31.19	70	40.9	13
pt. 6.3	28.67	19	53.9	4	62.62	19	82.3	7	30.91	15	21.3	3	30.45	74	41.8	9
16.3	28.46	21	54.0	1	62.41	21	82.6	3	30.75	16	21.5	2	29.68	77	42.1	3
26.2	28.25	21	53.9	1	62.20	21	82.5	1	30.58	17	21.5	0	28.90	78	41.9	2
ct. 6.2	28.05	20	53.6	3	62.00	20	81.9	6	30.42	16	21.2	3	28.13	77	41.1	8
16.2	27.86	19	53.0	6	61.81	19	81.0	9	30.27	15	20.8	4	27.39	74	39.8	13
26.1	27.71	15	52.3	7	61.64	17	79.7	13	30.15	12	20.2	6	26.71	68	38.1	17
ov. 5.1	27.60	11	51.4	9	61.51	13	78.0	17	30.06	9	19.4	8	26.10	61	35.8	23
15.1	27.54	6	50.4	10	61.42	9	75.9	21	30.00	6	18.3	11	25.58	52	33.1	27
25.1	27.54	0	49.3	11	61.37	5	73.6	23	29.99	1	17.0	13	25.18	40	30.0	31
ec. 5.0	27.60	6	48.2	11	61.37	0	71.0	26	30.03	4	15.6	14	24.89	29	26.7	33
15.0	27.73	13	47.2	10	61.43	6	68.2	28	30.12	9	14.0	16	24.74	15	23.2	35
25.0	27.91	18	46.2	10	61.53	10	65.3	29	30.25	13	12.4	16	24.73	1	19.5	37
35.0	28.15	24	45.3	9	61.69	16	62.3	30	30.42	17	10.7	17	24.86	13	15.8	37
δ, Tan δ	1.307		−0.842		1.130		+0.527		1.001		+0.048		3.269		+3.113	
an Place	25ˢ.779		37″.65		60ˢ.837		77″.55		28ˢ.777		22″.90		30ˢ.030		32″.25	
α, $D_\omega \alpha$	+0.02		0.00		−0.01		0.00		0.00		0.00		−0.08		+0.01	
δ, $D_\omega \delta$	0.0		−1.0		0.0		−1.0		0.0		−1.0		0.0		−1.0	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	**89 Herculis.** Mag. 5.5				**ξ Draconis.** Mag. 3.9				**θ Herculis.** Mag. 4.0				**85 Draconis.** Mag. 5.0			
	Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination N.	
	h m 17 51		° ′ +26 3		h m 17 51		° ′ +56 52		h m 17 53		° ′ +37 15		h m 17 53		° ′ +76 58	
	s		″		s		″		s		″		s		″	
Jan. 1.0	50.38		37.7		57.93		58.8		12.13		30.8		17.77		18.9	
10.9	50.55	17	34.9	28	58.10	17	55.2	36	12.29	16	27.6	32	17.97	20	15.3	36
20.9	50.76	21	32.2	27	58.34	24	51.8	34	12.50	21	24.6	30	18.36	39	11.9	34
30.9	51.00	24	29.8	24	58.64	30	48.7	31	12.76	26	21.8	28	18.91	55	8.8	31
Feb. 9.9	51.27	27	27.6	22	58.99	35	46.0	27	13.04	28	19.4	24	19.61	70	6.2	26
19.8	51.56	29	25.9	17	59.39	40	43.9	21	13.35	31	17.4	20	20.43	82	4.1	21
29.8	51.87	31	24.6	13	59.82	43	42.3	16	13.68	33	16.0	14	21.34	91	2.5	16
Mar. 10.8	52.18	31	23.8	8	60.27	45	41.4	9	14.01	33	15.2	8	22.31	97	1.6	9
20.7	52.50	32	23.6	2	60.72	45	41.2	2	14.35	34	14.9	3	23.30	99	1.3	3
30.7	52.81	31	23.9	3	61.17	45	41.6	4	14.69	34	15.3	4	24.27	97	1.7	4
Apr. 9.7	53.11	30	24.7	8	61.60	43	42.6	10	15.02	33	16.2	9	25.20	93	2.8	11
19.7	53.40	29	26.0	13	62.01	41	44.3	17	15.33	31	17.6	14	26.05	85	4.5	17
29.6	53.68	28	27.7	17	62.37	36	46.4	21	15.62	29	19.5	19	26.80	75	6.6	21
May 9.6	53.92	24	29.7	20	62.69	32	49.0	26	15.88	26	21.8	23	27.43	63	9.2	26
19.6	54.14	22	32.0	23	62.96	27	51.9	29	16.11	23	24.4	26	27.92	49	12.1	29
29.6	54.33	19	34.4	24	63.17	21	55.1	32	16.30	19	27.2	28	28.24	32	15.3	32
June 8.5	54.49	16	36.9	25	63.32	15	58.4	33	16.45	15	30.1	29	28.41	17	18.6	33
18.5	54.60	11	39.5	26	63.39	7	61.7	33	16.55	10	33.0	29	28.41	0	21.9	33
28.5	54.68	8	42.0	25	63.40	1	65.0	33	16.61	6	35.9	29	28.24	17	25.2	33
July 8.4	54.71	3	44.4	24	63.34	6	68.1	31	16.62	1	38.7	28	27.91	33	28.3	31
18.4	54.70	1	46.6	22	63.22	12	71.0	29	16.59	3	41.3	26	27.42	49	31.2	29
28.4	54.64	6	48.6	20	63.03	19	73.7	27	16.51	8	43.6	23	26.80	62	33.9	27
Aug. 7.4	54.55	9	50.3	17	62.78	25	75.9	22	16.38	13	45.6	20	26.04	76	36.2	23
17.3	54.42	13	51.7	14	62.49	29	77.8	19	16.22	16	47.2	16	25.17	87	38.1	19
27.3	54.26	16	52.8	11	62.15	34	79.2	14	16.02	20	48.5	13	24.22	95	39.5	14
Sept. 6.3	54.07	19	53.5	7	61.77	38	80.2	10	15.79	23	49.3	8	23.19	103	40.4	9
16.3	53.87	20	53.8	3	61.38	39	80.6	4	15.55	24	49.7	4	22.12	107	40.8	4
26.2	53.67	20	53.8	0	60.98	40	80.6	0	15.31	24	49.7	0	21.03	109	40.8	0
Oct. 6.2	53.46	21	53.4	4	60.58	40	80.0	6	15.06	25	49.3	4	19.95	108	40.3	5
16.2	53.27	19	52.6	8	60.20	38	78.9	11	14.83	23	48.3	10	18.91	104	39.2	11
26.1	53.11	16	51.4	12	59.85	35	77.3	16	14.63	20	46.9	14	17.93	98	37.6	16
Nov. 5.1	52.98	13	49.9	15	59.55	30	75.2	21	14.46	17	45.1	18	17.04	89	35.5	21
15.1	52.88	10	48.0	19	59.30	25	72.7	25	14.33	13	42.9	22	16.26	78	33.0	25
25.1	52.83	5	45.7	23	59.11	19	69.7	30	14.25	8	40.3	26	15.63	63	30.1	29
Dec. 5.0	52.83	0	43.2	25	59.00	11	66.5	32	14.22	3	37.5	28	15.16	47	26.9	32
15.0	52.88	5	40.6	26	58.97	3	63.0	35	14.25	3	34.5	30	14.87	29	23.4	35
25.0	52.98	10	37.8	28	59.01	4	59.4	36	14.33	8	31.3	32	14.76	11	19.8	36
35.0	53.12	14	35.0	28	59.13	12	55.8	36	14.46	13	28.1	32	14.85	9	16.2	36
Sec δ, Tan δ	1.113		+0.489		1.830		+1.533		1.256		+0.761		4.436		+4.322	
Mean Place	52ˢ.207		48″.23		60ˢ.494		70″.33		14ˢ.092		41″.81		23ˢ.250		30″.44	
D′ψ α, Dω α	−0.01		0.00		−0.04		0.00		−0.02		0.00		−0.11		+0.01	
Dψ δ, Dω δ	0.0		−1.0		0.0		−1.0		0.0		−1.0		0.0		−1.0	

FOR THE UPPER TRANSIT AT WASHINGTON.

n Solar ate.	**ν Ophiuchi.** Mag. 3.5				**ξ Herculis.** Mag. 3.8				**γ Draconis.** Mag. 2.4				**67 Ophiuchi.** Mag. 3.9			
	Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination N.	
	h m 17 54		° ′ − 9 45		h m 17 54		° ′ +29 14		h m 17 54		° ′ +51 29		h m 17 56		° ′ + 2 55	
	s		″		s		″		s		″		s		″	
n. 1.0	9.05	20	57.1	10	18.86	16	73.8	29	31.42	16	44.5	35	12.50	18	57.2	18
10.9	9.25	23	58.1	10	19.02	21	70.9	28	31.58	23	41.0	34	12.68	22	55.4	17
20.9	9.48	25	59.1	10	19.23	24	68.1	26	31.81	28	37.6	30	12.90	24	53.7	15
30.9	9.73	28	60.1	9	19.47	27	65.5	22	32.09	32	34.6	27	13.14	27	52.2	13
b. 9.9	10.01	29	61.0	7	19.74	30	63.3	18	32.41	36	31.9	21	13.41	28	50.9	11
19.8	10.30	30	61.7	5	20.04	31	61.5	14	32.77	38	29.8	16	13.69	29	49.8	9
29.8	10.60	31	62.2	4	20.35	32	60.1	8	33.15	41	28.2	9	13.98	30	48.9	5
ar. 10.8	10.91	31	62.6	2	20.67	32	59.3	2	33.56	41	27.3	3	14.28	30	48.4	2
20.8	11.22	31	62.8	1	20.99	31	59.1	3	33.97	40	27.0	4	14.58	30	48.2	2
30.7	11.53	31	62.7	3	21.30	31	59.4	8	34.37	39	27.4	10	14.88	29	48.4	4
pr. 9.7	11.84	29	62.4	4	21.61	30	60.2	13	34.76	37	28.4	16	15.17	29	48.8	8
19.7	12.13	28	62.0	6	21.91	28	61.5	18	35.13	34	30.0	21	15.46	27	49.6	10
29.6	12.41	26	61.4	7	22.19	25	63.3	21	35.47	30	32.1	25	15.73	25	50.6	12
ay 9.6	12.67	24	60.7	8	22.44	23	65.4	23	35.77	25	34.6	29	15.98	23	51.8	14
19.6	12.91	21	59.9	8	22.67	19	67.7	26	36.02	20	37.5	31	16.21	20	53.2	15
29.6	13.12	18	59.1	8	22.86	15	70.3	26	36.22	15	40.6	32	16.41	17	54.7	15
ne 8.5	13.30	15	58.3	8	23.01	12	72.9	27	36.37	9	43.8	32	16.58	14	56.2	15
18.5	13.45	11	57.5	7	23.13	7	75.6	27	36.46	3	47.0	32	16.72	10	57.7	14
28.5	13.56	7	56.8	7	23.20	3	78.3	25	36.49	3	50.2	31	16.82	7	59.1	14
ly 8.4	13.63	3	56.1	6	23.23	2	80.8	23	36.46	9	53.3	29	16.89	2	60.5	12
18.4	13.66	1	55.5	5	23.21	6	83.1	21	36.37	14	56.2	26	16.91	2	61.7	11
28.4	13.65	5	55.0	4	23.15	10	85.2	18	36.23	20	58.8	22	16.89	6	62.8	10
g. 7.4	13.60	8	54.6	3	23.05	13	87.0	15	36.03	25	61.0	19	16.83	9	63.8	8
17.3	13.52	12	54.3	2	22.92	17	88.5	12	35.78	28	62.9	14	16.74	12	64.6	5
27.3	13.40	14	54.1	2	22.75	19	89.7	8	35.50	31	64.3	10	16.62	14	65.1	4
pt. 6.3	13.26	16	53.9	0	22.56	21	90.5	4	35.19	34	65.3	4	16.48	16	65.5	2
16.3	13.10	16	53.9	0	22.35	22	90.9	0	34.85	34	65.7	0	16.32	17	65.7	1
26.2	12.94	16	53.9	1	22.13	21	90.9	5	34.51	34	65.7	5	16.15	17	65.8	2
t. 6.2	12.78	15	54.0	1	21.92	20	90.4	8	34.17	32	65.2	11	15.98	15	65.6	5
16.2	12.63	13	54.1	3	21.72	18	89.6	12	33.85	30	64.1	15	15.83	13	65.1	6
26.1	12.50	9	54.4	3	21.54	14	88.4	16	33.55	25	62.6	20	15.70	10	64.5	8
v. 5.1	12.41	5	54.7	5	21.40	11	86.8	20	33.30	21	60.6	25	15.60	6	63.7	10
15.1	12.36	1	55.2	6	21.29	6	84.8	23	33.09	15	58.1	28	15.54	2	62.7	12
25.1	12.35	4	55.8	6	21.23	1	82.5	26	32.94	8	55.3	31	15.52	3	61.5	14
c. 5.0	12.39	8	56.4	8	21.22	4	79.9	28	32.86	1	52.2	34	15.55	7	60.1	15
15.0	12.47	13	57.2	9	21.26	10	77.1	29	32.85	5	48.8	35	15.62	12	58.6	17
25.0	12.60	18	58.1	10	21.36	14	74.2	29	32.90	12	45.3	36	15.74	15	56.9	16
35.0	12.78		59.1		21.50		71.3		33.02		41.7		15.89		55.3	
δ, Tan δ	1.015		−0.172		1.146		+0.560		1.606		+1.257		1.001		+0.051	
n Place	10ˢ.885		48″.85		20ˢ.720		84″.41		33ˢ.755		55″.83		14ˢ.277		66″.31	
α, $D_\omega \alpha$	0.00		0.00		−0.01		0.00		−0.03		0.00		0.00		0.00	
, $D_\omega \delta$	0.0		−1.0		0.0		−1.0		0.0		−1.0		0.0		−1.0	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	θ Aræ. Mag. 3.9				γ Sagittarii. Mag. 3.1				70 Ophiuchi. Mag. 4.1				72 Ophiuchi. Mag. 3.7			
	Right Ascension.		Declination S.		Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination N.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	17 59		−50 5		18 0		−30 25		18 0		+ 2 30		18 3		+ 9 32	
	s		″		s		″		s		″		s		″	
Jan. 1.0	44.05		60.5		7.11		40.9		58.62		59.8		8.85		53.0	
10.9	44.32	27	59.1	14	7.33	22	40.6	3	58.80	18	58.1	17	9.02	17	51.0	20
20.9	44.65	33	57.8	13	7.59	26	40.4	2	59.01	21	56.5	16	9.23	21	49.0	20
30.9	45.03	38	56.7	11	7.88	29	40.3	1	59.25	24	54.9	16	9.46	23	47.2	18
Feb. 9.9	45.44	41	55.8	9	8.19	31	40.2	1	59.51	26	53.5	14	9.72	26	45.6	16
19.8	45.87	43	55.1	7	8.53	34	40.2	0	59.79	28	52.4	11	10.00	28	44.3	13
29.8	46.32	45	54.6	5	8.87	34	40.2	0	60.08	29	51.6	8	10.29	29	43.3	10
Mar. 10.8	46.79	47	54.3	3	9.22	35	40.2	0	60.38	30	51.0	6	10.58	29	42.7	6
20.8	47.26	47	54.3	0	9.58	36	40.3	1	60.68	30	50.8	2	10.88	30	42.5	2
30.7	47.72	46	54.5	2	9.94	36	40.3	0	60.98	30	50.9	1	11.18	30	42.6	1
Apr. 9.7	48.18	46	54.9	4	10.29	35	40.4	1	61.28	30	51.4	5	11.47	29	43.2	6
19.7	48.62	44	55.4	5	10.63	34	40.4	0	61.57	29	52.1	7	11.76	29	44.1	9
29.6	49.04	42	56.1	7	10.95	32	40.5	1	61.84	27	53.1	10	12.03	27	45.3	12
May 9.6	49.44	40	57.1	10	11.25	30	40.7	2	62.09	25	54.3	12	12.28	25	46.8	15
19.6	49.80	36	58.2	11	11.53	28	40.9	2	62.32	23	55.6	13	12.51	23	48.5	17
29.6	50.12	32	59.4	12	11.78	25	41.1	2	62.53	21	57.0	14	12.72	21	50.3	18
June 8.5	50.40	28	60.8	14	12.00	22	41.5	4	62.71	18	58.5	15	12.89	17	52.2	19
18.5	50.62	22	62.3	15	12.18	18	41.9	4	62.85	14	60.0	15	13.03	14	54.0	18
28.5	50.78	16	63.9	16	12.32	14	42.3	4	62.96	11	61.4	14	13.13	10	55.8	18
July 8.5	50.88	10	65.5	16	12.41	9	42.8	5	63.03	7	62.7	13	13.19	6	57.6	18
18.4	50.92	4	67.0	15	12.45	4	43.3	5	63.06	3	63.9	12	13.22	3	59.2	16
28.4	50.90	2	68.5	15	12.44	1	43.9	6	63.04	2	65.0	11	13.20	2	60.6	14
Aug. 7.4	50.81	9	69.9	14	12.39	5	44.4	5	62.99	5	65.9	9	13.14	6	61.8	12
17.3	50.67	14	71.1	12	12.30	9	44.9	5	62.90	9	66.6	7	13.04	10	62.8	10
27.3	50.49	18	72.0	9	12.18	12	45.3	4	62.78	12	67.2	6	12.92	12	63.6	8
Sept. 6.3	50.26	23	72.7	7	12.02	16	45.6	3	62.64	14	67.6	4	12.77	15	64.2	6
16.3	50.01	25	73.1	4	11.84	18	45.8	2	62.48	16	67.7	1	12.60	17	64.5	3
26.2	49.75	26	73.2	1	11.66	18	45.8	0	62.32	16	67.7	0	12.43	17	64.5	0
Oct. 6.2	49.50	25	72.9	3	11.47	19	45.7	1	62.15	17	67.5	2	12.26	17	64.3	2
16.2	49.26	24	72.3	6	11.30	17	45.5	2	62.00	15	67.1	4	12.10	16	63.8	5
26.2	49.05	21	71.4	9	11.16	14	45.1	4	61.87	13	66.5	6	11.96	14	63.0	8
Nov. 5.1	48.89	16	70.3	11	11.05	11	44.7	4	61.77	10	65.6	9	11.85	11	62.0	10
15.1	48.79	10	68.9	14	10.99	6	44.2	5	61.70	7	64.6	10	11.77	8	60.8	12
25.1	48.76	3	67.4	15	10.98	1	43.7	5	61.68	2	63.4	12	11.74	3	59.3	15
Dec. 5.0	48.79	3	65.8	16	11.02	4	43.2	5	61.70	2	62.1	13	11.75	1	57.6	17
15.0	48.90	11	64.1	17	11.11	9	42.7	5	61.77	7	60.6	15	11.81	6	55.7	19
25.0	49.08	18	62.5	16	11.26	15	42.2	5	61.88	11	58.9	17	11.92	11	53.8	19
35.0	49.32	24	60.9	16	11.45	19	41.9	3	62.04	16	57.3	16	12.06	14	51.8	20
Sec δ, Tan δ	1.559		−1.196		1.160		−0.587		1.001		+0.044		1.014		+0.168	
Mean Place	46ˢ.817		54″.53		9ˢ.222		33″.71		60ˢ.401		68″.99		10ˢ.631		62″.54	
D′ψ a, Dω a	+0.03		0.00		+0.02		0.00		0.00		0.00		0.00		0.00	
Dψ δ, Dω δ	0.0		−1.0		0.0		−1.0		0.0		−1.0		0.0		−1.0	

FOR THE UPPER TRANSIT AT WASHINGTON.

an Solar Date.	o Herculis. Mag. 3.8				μ Sagittarii. Mag. 4.0				η Sagittarii. Mag. 3.2				Groombridge 2533. Mag. 5.4			
	Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination S.		Right Ascension.		Declination N.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	18 4		+28 44		18 8		−21 4		18 11		−36 47		18 12		+42 7	
	s		″		s		″		s		″		s		″	
n. 1.0	4.68		48.8		28.05		65.8		38.14		27.1		52.40		33.6	
11.0	4.84	16	45.9	29	28.25	20	66.0	2	38.36	22	26.4	7	52.54	14	30.3	33
20.9	5.04	20	43.1	28	28.48	23	66.3	3	38.62	26	25.8	6	52.73	19	27.1	32
30.9	5.27	23	40.6	25	28.74	26	66.6	3	38.92	30	25.2	6	52.97	24	24.2	29
b. 9.9	5.53	26	38.4	22	29.03	29	66.9	3	39.25	33	24.7	5	53.24	27	21.6	26
19.8	5.82	29	36.5	19	29.33	30	67.1	2	39.60	35	24.4	3	53.55	31	19.4	22
29.8	6.12	30	35.1	14	29.65	32	67.3	2	39.96	36	24.1	3	53.88	33	17.8	16
ar. 10.8	6.43	31	34.3	8	29.97	32	67.4	1	40.34	38	23.9	2	54.23	35	16.8	10
20.8	6.75	32	34.0	3	30.30	33	67.4	0	40.72	38	23.8	1	54.58	35	16.4	4
30.7	7.07	32	34.2	2	30.63	33	67.3	1	41.10	38	23.7	1	54.94	36	16.6	2
r. 9.7	7.38	31	35.0	8	30.95	32	67.1	2	41.48	38	23.8	1	55.29	35	17.4	8
19.7	7.68	30	36.3	13	31.27	32	66.9	2	41.85	37	23.9	1	55.62	33	18.8	14
29.7	7.96	28	38.0	17	31.58	31	66.6	3	42.20	35	24.1	2	55.94	32	20.6	18
ay 9.6	8.22	26	40.0	20	31.87	29	66.3	3	42.53	33	24.4	3	56.23	29	22.9	23
19.6	8.45	23	42.3	23	32.13	26	66.0	3	42.84	31	24.8	4	56.48	25	25.5	26
29.6	8.65	20	44.9	26	32.37	24	65.7	3	43.12	28	25.3	5	56.70	22	28.4	29
me 8.5	8.82	17	47.5	26	32.58	21	65.5	2	43.37	25	25.9	6	56.87	17	31.5	31
18.5	8.95	13	50.2	27	32.76	18	65.3	2	43.57	20	26.6	7	56.99	12	34.6	31
28.5	9.03	8	52.8	26	32.89	13	65.2	1	43.72	15	27.4	8	57.07	8	37.7	31
ly 8.5	9.07	4	55.4	26	32.98	9	65.1	1	43.83	11	28.2	8	57.09	2	40.7	30
18.4	9.06	1	57.8	24	33.03	5	65.1	0	43.89	6	29.1	9	57.06	3	43.5	28
28.4	9.01	5	59.9	21	33.04	1	65.1	0	43.89	0	30.0	9	56.98	8	46.1	26
g. 7.4	8.92	9	61.8	19	33.00	4	65.2	1	43.84	5	30.8	8	56.85	13	48.4	23
17.4	8.79	13	63.4	16	32.92	8	65.4	2	43.75	9	31.6	8	56.68	17	50.3	19
27.3	8.63	16	64.6	12	32.81	11	65.5	1	43.62	13	32.2	6	56.47	21	51.8	15
pt. 6.3	8.44	19	65.5	9	32.67	14	65.6	1	43.45	17	32.7	5	56.23	24	52.9	11
16.3	8.24	20	65.9	4	32.51	16	65.7	1	43.26	19	33.1	4	55.97	26	53.6	7
26.2	8.02	22	66.0	1	32.34	17	65.8	1	43.06	20	33.2	1	55.70	27	53.8	2
t. 6.2	7.81	21	65.7	3	32.17	17	65.8	0	42.86	20	33.1	1	55.43	27	53.6	2
16.2	7.61	20	64.9	8	32.01	16	65.8	0	42.67	19	32.9	2	55.17	26	52.8	8
26.2	7.43	18	63.8	11	31.87	14	65.7	1	42.51	16	32.4	5	54.93	24	51.6	12
v. 5.1	7.28	15	62.3	15	31.77	10	65.6	1	42.38	13	31.8	6	54.72	21	49.9	17
15.1	7.17	11	60.4	19	31.71	6	65.6	0	42.30	8	31.0	8	54.55	17	47.8	21
25.1	7.11	6	58.2	22	31.69	2	65.5	1	42.27	3	30.2	8	54.43	12	45.3	25
c. 5.1	7.09	2	55.7	25	31.72	3	65.5	0	42.30	3	29.3	9	54.36	7	42.4	29
15.0	7.12	3	53.0	27	31.80	8	65.6	1	42.39	9	28.4	9	54.35	1	39.3	31
25.0	7.20	8	50.1	29	31.92	12	65.7	1	42.53	14	27.6	8	54.40	5	36.1	32
35.0	7.33	13	47.2	29	32.10	18	65.9	2	42.72	19	26.8	8	54.51	11	32.8	33
, Tan δ	1.141		+0.549		1.072		−0.386		1.248		−0.748		1.348		+0.904	
n Place	6ˢ.562		59″.10		30ˢ.008		57″.62		40ˢ.397		19″.56		54ˢ.523		43″.86	
, Dω α	−0.01		0.00		+0.01		0.00		+0.02		0.00		−0.02		0.00	
, Dω δ	0.0		−1.0		0.0		−1.0		0.0		−1.0		0.0		−1.0	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	36 Draconis. Mag. 5.0				δ Sagittarii. Mag. 2.8				η Serpentis. Mag. 3.4				ε Sagittarii. Mag. 2.0			
	Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination S.		Right Ascension.		Declination S.	
	h m 18 13		° ′ +64 21		h m 18 15		° ′ −29 51		h m 18 16		° ′ − 2 55		h m 18 18		° ′ −34 25	
	s		″		s		″		s		″		s		″	
Jan. 1.0	20.19		52.1		19.52		67.0		43.53		29.5		17.66		45.1	
11.0	20.32	13	48.4	37	19.73	21	66.7	3	43.69	16	30.8	13	17.87	21	44.5	6
20.9	20.54	22	45.0	34	19.97	24	66.4	3	43.89	20	32.1	13	18.12	25	43.9	6
30.9	20.84	30	41.8	32	20.25	28	66.2	2	44.12	23	33.3	12	18.40	28	43.4	5
Feb. 9.9	21.22	38	38.9	29	20.55	30	66.0	2	44.38	26	34.4	11	18.71	31	43.0	4
19.8	21.67	45	36.5	24	20.87	32	65.9	1	44.65	27	35.3	9	19.05	34	42.7	3
29.8	22.17	50	34.7	18	21.21	34	65.8	1	44.94	29	36.0	7	19.40	35	42.4	3
Mar. 10.8	22.70	53	33.5	12	21.56	35	65.6	2	45.23	29	36.4	4	19.76	36	42.2	2
20.8	23.25	55	33.0	5	21.91	35	65.5	1	45.53	30	36.5	1	20.13	37	42.0	2
30.7	23.80	55	33.2	2	22.26	35	65.4	1	45.83	30	36.4	1	20.50	37	41.9	1
Apr. 9.7	24.33	53	34.0	8	22.61	35	65.3	1	46.13	30	36.0	4	20.87	37	41.8	1
19.7	24.84	51	35.5	15	22.96	35	65.2	1	46.43	30	35.3	7	21.23	36	41.8	0
29.7	25.30	46	37.5	20	23.29	33	65.2	0	46.71	28	34.4	9	21.58	35	41.8	0
May 9.6	25.71	41	40.0	25	23.60	31	65.2	0	46.97	26	33.4	10	21.91	33	42.0	2
19.6	26.06	35	42.8	28	23.89	29	65.2	0	47.22	25	32.3	11	22.22	31	42.2	2
29.6	26.33	27	46.0	32	24.16	27	65.3	1	47.44	22	31.1	12	22.50	28	42.6	4
June 8.5	26.52	19	49.3	33	24.39	23	65.5	2	47.64	20	29.8	13	22.74	24	43.0	4
18.5	26.62	10	52.7	34	24.58	19	65.8	3	47.80	16	28.5	13	22.95	21	43.5	5
28.5	26.64	2	56.1	34	24.73	15	66.2	4	47.92	12	27.3	12	23.11	16	44.2	7
July 8.5	26.58	6	59.4	33	24.84	11	66.6	4	48.01	9	26.2	11	23.22	11	44.9	7
18.4	26.43	15	62.5	31	24.90	6	67.1	5	48.05	4	25.2	10	23.28	6	45.6	7
28.4	26.19	24	65.4	29	24.91	1	67.7	6	48.06	1	24.4	8	23.30	2	46.4	8
Aug. 7.4	25.88	31	67.9	25	24.87	4	68.2	5	48.02	4	23.7	7	23.26	4	47.1	7
17.4	25.50	38	70.1	22	24.79	8	68.7	5	47.94	8	23.1	6	23.18	8	47.8	7
27.3	25.07	43	71.8	17	24.67	12	69.1	4	47.83	11	22.7	4	23.05	13	48.4	6
Sept. 6.3	24.59	48	73.1	13	24.52	15	69.4	3	47.70	13	22.4	3	22.89	16	48.9	5
16.3	24.08	51	73.9	8	24.35	17	69.7	3	47.54	16	22.2	2	22.71	18	49.2	3
26.2	23.55	53	74.1	2	24.17	18	69.8	1	47.38	16	22.2	0	22.52	19	49.4	2
Oct. 6.2	23.02	53	73.9	2	23.99	18	69.8	0	47.22	16	22.3	1	22.33	19	49.4	0
16.2	22.51	51	73.1	8	23.81	18	69.7	1	47.06	16	22.6	3	22.14	19	49.2	2
26.2	22.03	48	71.7	14	23.66	15	69.4	3	46.92	14	23.1	5	21.98	16	48.8	4
Nov. 5.1	21.59	44	69.9	18	23.55	11	69.1	3	46.81	11	23.7	6	21.85	13	48.3	5
15.1	21.21	38	67.6	23	23.47	8	68.7	4	46.74	7	24.4	7	21.77	8	47.7	6
25.1	20.91	30	64.8	28	23.45	2	68.2	5	46.71	3	25.3	9	21.74	3	47.0	7
Dec. 5.1	20.69	22	61.7	31	23.47	2	67.7	5	46.72	1	26.3	10	21.76	2	46.3	7
15.0	20.56	13	58.3	34	23.55	8	67.2	5	46.78	6	27.4	11	21.83	7	45.5	8
25.0	20.53	3	54.8	35	23.68	13	66.7	5	46.88	10	28.7	13	21.96	13	44.8	7
35.0	20.59	6	51.1	37	23.85	17	66.3	4	47.02	14	30.0	13	22.14	18	44.1	7
Sec δ, Tan δ	2.312		+2.084		1.153		−0.574		1.001		−0.051		1.212		−0.686	
Mean Place	$23^{s}.423$		$62''.32$		$21^{s}.620$		$58''.95$		$45^{s}.334$		$20''.37$		$19^{s}.848$		$37''.03$	
$D'_\psi \alpha$, $D_\omega \alpha$	−0.06		−0.01		+0.02		0.00		0.00		0.00		+0.02		0.00	
$D_\psi \delta$, $D_\omega \delta$	0.0		−1.0		0.0		−1.0		0.0		−1.0		0.0		−1.0	

FOR THE UPPER TRANSIT AT WASHINGTON.

an Solar Date.	109 Herculis. Mag. 3.9				α Telescopii. Mag. 3.8				λ Sagittarii. Mag. 2.9				χ Draconis. Mag. 3.7			
	Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination S.		Right Ascension.		Declination N.	
	h m 18 19 s		° ′ +21 43 ″		h m 18 20 s		° ′ −46 1 ″		h m 18 22 s		° ′ −25 28 ″		h m 18 22 s		° ′ +72 41 ″	
n. 1.0	55.02		34.4		24.36		12.1		30.38		25.2		34.19		31.9	
11.0	55.16	14	31.8	26	24.60	24	10.8	13	30.57	19	25.1	1	34.29	10	28.3	36
20.9	55.34	18	29.3	25	24.88	28	9.6	12	30.80	23	25.0	1	34.52	23	24.8	35
30.9	55.56	22	27.0	23	25.21	33	8.5	11	31.06	26	25.0	0	34.88	36	21.5	33
b. 9.9	55.81	25	24.9	21	25.57	36	7.5	10	31.34	28	25.0	0	35.37	49	18.6	29
19.9	56.08	27	23.2	17	25.96	39	6.7	8	31.65	31	24.9	1	35.95	58	16.1	25
29.8	56.36	28	21.9	13	26.37	41	6.1	6	31.97	32	24.9	0	36.62	67	14.2	19
ar. 10.8	56.66	30	21.1	8	26.80	43	5.6	5	32.30	33	24.8	1	37.34	72	12.9	13
20.8	56.97	31	20.8	3	27.23	43	5.3	3	32.64	34	24.7	1	38.10	76	12.3	6
30.7	57.28	31	20.9	1	27.67	44	5.2	1	32.98	34	24.5	2	38.86	76	12.3	0
r. 9.7	57.58	30	21.6	7	28.10	43	5.2	0	33.32	34	24.3	2	39.61	75	13.0	7
19.7	57.88	30	22.7	11	28.52	42	5.4	2	33.65	33	24.1	2	40.32	71	14.3	13
29.7	58.17	29	24.2	15	28.93	41	5.8	4	33.97	32	23.8	3	40.97	65	16.2	19
ay 9.6	58.43	26	26.0	18	29.31	38	6.4	6	34.28	31	23.6	2	41.54	57	18.6	24
19.6	58.67	24	28.1	21	29.67	36	7.1	7	34.56	28	23.4	2	42.01	47	21.4	28
29.6	58.89	22	30.4	23	29.99	32	8.0	9	34.82	26	23.2	2	42.37	36	24.4	30
ne 8.6	59.07	18	32.8	24	30.27	28	9.0	10	35.05	23	23.1	1	42.62	25	27.6	32
18.5	59.22	15	35.2	24	30.51	24	10.2	12	35.25	20	23.1	0	42.74	12	31.0	34
28.5	59.32	10	37.6	24	30.69	18	11.5	13	35.40	15	23.2	1	42.73	1	34.4	34
ly 8.5	59.39	7	40.0	24	30.82	13	12.8	13	35.51	11	23.4	2	42.60	13	37.7	33
18.4	59.41	2	42.2	22	30.88	6	14.2	14	35.57	6	23.7	3	42.35	25	40.9	32
28.4	59.39	2	44.2	20	30.89	1	15.5	13	35.59	2	24.0	3	41.98	37	43.8	29
g. 7.4	59.32	7	45.9	17	30.84	5	16.8	13	35.56	3	24.3	3	41.50	48	46.4	26
17.4	59.22	10	47.4	15	30.74	10	18.0	12	35.49	7	24.6	3	40.93	57	48.7	23
27.3	59.09	13	48.6	12	30.59	15	19.0	10	35.38	11	24.9	3	40.27	66	50.6	19
pt. 6.3	58.92	17	49.5	9	30.40	19	19.7	7	35.24	14	25.2	3	39.55	72	52.0	14
16.3	58.74	18	50.0	5	30.18	22	20.3	6	35.08	16	25.4	2	38.78	77	52.9	9
26.3	58.55	19	50.2	2	29.94	24	20.5	2	34.90	18	25.5	1	37.98	80	53.3	4
t. 6.2	58.36	19	50.0	2	29.70	24	20.4	1	34.73	17	25.6	1	37.18	80	53.2	1
16.2	58.17	19	49.4	6	29.48	22	20.1	3	34.56	17	25.6	0	36.39	79	52.6	6
26.2	58.00	17	48.5	9	29.28	20	19.5	6	34.41	15	25.5	1	35.64	75	51.4	12
v. 5.1	57.86	14	47.3	12	29.12	16	18.6	9	34.30	11	25.3	2	34.94	70	49.7	17
15.1	57.76	10	45.7	16	29.01	11	17.5	11	34.22	8	25.1	2	34.32	62	47.5	22
25.1	57.69	7	43.8	19	28.96	5	16.3	12	34.19	3	24.8	3	33.80	52	44.9	26
ec. 5.1	57.67	2	41.7	21	28.97	1	14.9	14	34.21	2	24.6	2	33.40	40	41.9	30
15.0	57.70	3	39.3	24	29.04	7	13.4	15	34.28	7	24.4	2	33.12	28	38.6	33
25.0	57.78	8	36.8	25	29.18	14	12.0	14	34.39	11	24.2	2	32.98	14	35.1	35
35.0	57.89	11	34.2	26	29.38	20	10.6	14	34.56	17	24.0	2	32.98	0	31.5	36
δ, Tan δ	1.076		+0.398		1.440		−1.037		1.108		−0.476		3.361		+3.210	
n Place	56ˢ.862		44″.11		26ˢ.915		4″.35		32ˢ.398		16″.55		38ˢ.745		41″.40	
α, D_ω α	−0.01		0.00		+0.03		+0.01		+0.01		0.00		−0.08		−0.02	
δ, D_ω δ	0.0		−1.0		0.0		−1.0		0.0		−1.0		0.0		−1.0	

Mean Solar Date.	*c* Serpentis. Mag. 5.4 Right Ascension.		*c* Serpentis. Declination S.		1 Aquilæ. Mag. 4.1 Right Ascension.		1 Aquilæ. Declination S.		ζ Pavonis. Mag. 4.1 Right Ascension.		ζ Pavonis. Declination S.		α Lyræ. Mag. 0.1 Right Ascension.		α Lyræ. Declination N.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	18 25		− 2 2		18 30		− 8 18		18 32		−71 30		18 33		+38 41	
	s		″		s		″		s		″		s		″	
Jan. 1.0	4.38	16	43.9	13	23.26	16	32.1	9	40.25	37	25.9	27	55.44	12	55.2	32
11.0	4.54	19	45.2	13	23.42	19	33.0	9	40.62	49	23.2	25	55.56	16	52.0	31
20.9	4.73	22	46.5	12	23.61	23	33.9	9	41.11	60	20.7	23	55.72	21	48.9	29
30.9	4.95	25	47.7	11	23.84	25	34.8	8	41.71	68	18.4	21	55.93	25	46.0	26
Feb. 9.9	5.20	27	48.8	9	24.09	27	35.6	6	42.39	76	16.3	17	56.18	28	43.4	22
19.9	5.47	29	49.7	6	24.36	29	36.2	5	43.15	81	14.6	14	56.46	31	41.2	17
29.8	5.76	29	50.3	4	24.65	29	36.7	2	43.96	86	13.2	11	56.77	32	39.5	11
Mar. 10.8	6.05	30	50.7	1	24.94	31	36.9	0	44.82	88	12.1	7	57.09	34	38.4	5
20.8	6.35	30	50.8	2	25.25	31	36.9	2	45.70	89	11.4	3	57.43	35	37.9	0
30.7	6.65	30	50.6	4	25.56	31	36.7	4	46.59	88	11.1	1	57.78	34	37.9	6
Apr. 9.7	6.95	30	50.2	7	25.87	30	36.3	6	47.47	87	11.2	5	58.12	33	38.5	12
19.7	7.25	28	49.5	10	26.17	29	35.7	8	48.34	83	11.7	9	58.45	32	39.7	17
29.7	7.53	28	48.5	11	26.46	28	34.9	9	49.17	78	12.6	12	58.77	30	41.4	22
May 9.6	7.81	25	47.4	12	26.74	26	34.0	10	49.95	72	13.8	15	59.07	27	43.6	25
19.6	8.06	23	46.2	13	27.00	24	33.0	10	50.67	64	15.3	18	59.34	23	46.1	27
29.6	8.29	20	44.9	14	27.24	22	32.0	11	51.31	55	17.1	21	59.57	20	48.8	29
June 8.6	8.49	17	43.5	13	27.46	18	30.9	10	51.86	45	19.2	23	59.77	15	51.7	31
18.5	8.66	13	42.2	13	27.64	14	29.9	9	52.31	33	21.5	25	59.92	10	54.8	31
28.5	8.79	9	40.9	12	27.78	10	29.0	9	52.64	21	24.0	25	60.02	6	57.9	30
July 8.5	8.88	5	39.7	11	27.88	6	28.1	7	52.85	9	26.5	25	60.08	0	60.9	29
18.4	8.93	1	38.6	9	27.94	2	27.4	7	52.94	4	29.0	25	60.08	5	63.8	26
28.4	8.94	3	37.7	8	27.96	3	26.7	5	52.90	16	31.5	23	60.03	9	66.4	24
Aug. 7.4	8.91	7	36.9	7	27.93	6	26.2	4	52.74	28	33.8	21	59.94	14	68.8	21
17.4	8.84	10	36.2	5	27.87	10	25.8	3	52.46	38	35.9	18	59.80	18	70.9	17
27.3	8.74	13	35.7	3	27.77	12	25.5	1	52.08	47	37.7	14	59.62	21	72.6	13
Sept. 6.3	8.61	15	35.4	2	27.65	15	25.4	1	51.61	53	39.1	9	59.41	23	73.9	9
16.3	8.46	16	35.2	1	27.50	16	25.3	0	51.08	57	40.0	5	59.18	25	74.8	4
26.3	8.30	17	35.1	1	27.34	17	25.3	1	50.51	58	40.5	0	58.93	25	75.2	0
Oct. 6.2	8.13	15	35.2	3	27.17	15	25.4	2	49.93	56	40.5	5	58.68	25	75.2	5
16.2	7.98	14	35.5	4	27.02	14	25.6	3	49.37	52	40.0	10	58.43	23	74.7	10
26.2	7.84	12	35.9	6	26.88	11	25.9	4	48.85	45	39.0	15	58.20	20	73.7	14
Nov. 5.1	7.72	8	36.5	8	26.77	8	26.3	5	48.40	35	37.5	19	58.00	17	72.3	18
15.1	7.64	3	37.3	8	26.69	4	26.8	6	48.05	24	35.6	22	57.83	12	70.5	22
25.1	7.61	0	38.1	10	26.65	0	27.4	7	47.81	11	33.4	25	57.71	8	68.3	26
Dec. 5.1	7.61	5	39.1	12	26.65	5	28.1	8	47.70	2	30.9	27	57.63	2	65.7	29
15.0	7.66	10	40.3	13	26.70	10	28.9	9	47.72	16	28.2	27	57.61	3	62.8	30
25.0	7.76	13	41.6	12	26.80	14	29.8	9	47.88	30	25.5	28	57.64	8	59.8	32
35.0	7.89		42.8		26.94		30.7		48.18		22.7		57.72		56.6	
Sec δ, Tan δ	1.001		−0.036		1.011		−0.146		3.153		−2.990		1.282		+0.801	
Mean Place	$6^{s}.187$		$34''.61$		$25^{s}.097$		$22''.80$		$45^{s}.334$		$17''.78$		$57^{s}.538$		$64''.37$	
$D'_{\psi}\alpha$, $D_{\omega}\alpha$	0.00		0.00		0.00		0.00		+0.08		+0.03		−0.02		−0.01	
$D_{\psi}\delta$, $D_{\omega}\delta$	0.0		−1.0		+0.1		−1.0		+0.1		−1.0		+0.1		−1.0	

FOR THE UPPER TRANSIT AT WASHINGTON.

an Solar Date.	**2 Aquilæ.** Mag. 4.7 Right Ascension.		Declination S.		**φ Sagittarii.** Mag. 3.3 Right Ascension.		Declination S.		**110 Herculis.** Mag. 4.3 Right Ascension.		Declination N.		**6 Aquilæ.** Mag. 4.5 Right Ascension.		Declination S.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	18 37		− 9 8		18 40		−27 4		18 41		+20 27		18 42		− 4 50	
	s		″		s		″		s		″		s		″	
n. 1.0	25.55		24.4		7.50		64.7		50.56		31.8		28.50		43.5	
11.0	25.70	15	25.2	8	7.67	17	64.4	3	50.68	12	29.3	25	28.64	14	44.6	11
20.9	25.89	19	26.1	9	7.88	21	64.2	2	50.84	16	26.9	24	28.82	18	45.6	10
30.9	26.11	22	26.9	8	8.12	24	64.0	2	51.04	20	24.7	22	29.04	22	46.6	10
b. 9.9	26.35	24	27.6	7	8.40	28	63.7	3	51.27	23	22.6	21	29.27	23	47.5	9
19.9	26.62	27	28.1	5	8.70	30	63.5	2	51.52	25	20.9	17	29.53	26	48.2	7
29.8	26.90	28	28.5	4	9.01	31	63.3	2	51.79	27	19.6	13	29.81	28	48.7	5
ar. 10.8	27.20	30	28.7	2	9.34	33	63.0	3	52.08	29	18.7	9	30.10	29	49.0	3
20.8	27.50	30	28.7	0	9.68	34	62.7	3	52.38	30	18.3	4	30.39	29	49.0	0
30.8	27.81	31	28.4	3	10.02	34	62.4	3	52.69	31	18.4	1	30.69	30	48.8	2
r. 9.7	28.12	31	27.9	5	10.37	35	62.0	4	53.00	31	19.0	6	31.00	31	48.3	5
19.7	28.42	30	27.3	6	10.71	34	61.6	4	53.30	30	20.0	10	31.30	30	47.6	7
29.7	28.72	30	26.5	8	11.05	34	61.2	4	53.59	29	21.4	14	31.60	30	46.7	9
ay 9.6	29.01	29	25.6	9	11.37	32	60.9	3	53.87	28	23.1	17	31.88	28	45.6	11
19.6	29.28	27	24.6	10	11.67	30	60.7	2	54.13	26	25.2	21	32.15	27	44.4	12
29.6	29.52	24	23.6	10	11.95	28	60.5	2	54.36	23	27.4	22	32.40	25	43.2	12
ne 8.6	29.74	22	22.6	10	12.20	25	60.4	1	54.56	20	29.8	24	32.61	21	41.9	13
18.5	29.93	19	21.6	10	12.41	21	60.4	0	54.73	17	32.2	24	32.80	19	40.6	13
28.5	30.08	15	20.6	10	12.58	17	60.5	1	54.86	13	34.7	25	32.95	15	39.4	12
ly 8.5	30.19	11	19.7	9	12.71	13	60.7	2	54.94	8	37.0	23	33.06	11	38.4	10
18.5	30.26	7	19.0	7	12.80	9	61.0	3	54.99	5	39.2	22	33.13	7	37.4	10
28.4	30.28	2	18.4	6	12.83	3	61.4	4	54.99	0	41.3	21	33.16	3	36.5	9
g. 7.4	30.26	2	17.9	5	12.81	2	61.8	4	54.94	5	43.2	19	33.14	2	35.8	7
17.4	30.21	5	17.5	4	12.76	5	62.2	4	54.86	8	44.7	15	33.08	6	35.2	6
27.3	30.11	10	17.3	2	12.66	10	62.6	4	54.74	12	46.0	13	32.99	9	34.8	4
pt. 6.3	29.99	12	17.2	1	12.53	13	63.0	4	54.59	15	47.0	10	32.87	12	34.5	3
16.3	29.84	15	17.1	1	12.37	16	63.4	4	54.42	17	47.7	7	32.73	14	34.4	1
26.3	29.68	16	17.1	0	12.19	18	63.6	2	54.23	19	48.0	3	32.57	16	34.3	1
t. 6.2	29.52	16	17.2	1	12.01	18	63.7	1	54.04	19	48.0	0	32.41	16	34.4	1
16.2	29.36	16	17.4	2	11.84	17	63.7	0	53.85	19	47.6	4	32.25	16	34.6	2
26.2	29.22	14	17.7	3	11.69	15	63.7	0	53.68	17	46.8	8	32.10	15	35.0	4
v. 5.2	29.10	12	18.0	3	11.56	13	63.5	2	53.53	15	45.8	10	31.98	12	35.5	5
15.1	29.02	8	18.5	5	11.47	9	63.2	3	53.41	12	44.4	14	31.90	8	36.1	6
25.1	28.98	4	19.0	5	11.42	5	62.9	3	53.33	8	42.7	17	31.85	5	36.8	7
c. 5.1	28.98	0	19.7	7	11.42	0	62.6	3	53.30	3	40.7	20	31.84	1	37.6	8
15.0	29.02	4	20.4	7	11.47	5	62.3	3	53.31	1	38.5	22	31.88	4	38.6	10
25.0	29.11	9	21.1	7	11.57	10	62.0	3	53.36	5	36.2	23	31.96	8	39.6	10
35.0	29.24	13	22.0	9	11.71	14	61.6	4	53.46	10	33.7	25	32.08	12	40.7	11
δ, Tan δ	1.013		−0.161		1.123		−0.512		1.068		+0.373		1.004		−0.085	
n Place	27ˢ.384		14″.99		9ˢ.520		55″.31		52ˢ.419		40″.98		30ˢ.317		33″.99	
a, $D_\omega a$	0.00		0.00		+0.01		+0.01		−0.01		0.00		0.00		0.00	
δ, $D_\omega \delta$	+0.1		−1.0		+0.1		−1.0		+0.1		−1.0		+0.1		−1.0	

Mean Solar Date.	λ Pavonis. Mag. 4.4 Right Ascension.		λ Pavonis. Declination S.		β Lyræ. Var. 3.4–4.1 Right Ascension.		β Lyræ. Declination N.		50 Draconis. Mag. 5.4 Right Ascension.		50 Draconis. Declination N.		σ Sagittarii. Mag. 2.1 Right Ascension.	
	h m 18 44		° ′ −62 17		h m 18 46		° ′ +33 15		h m 18 49		° ′ +75 19		h m 18 49	
	s		″		s		″		s		″		s	
Jan. 1.0	0.42		31.5		47.83		27.0		7.68		42.2		46.52	
11.0	0.68	26	29.1	24	47.94	11	24.0	30	7.66	2	38.6	36	46.68	16
21.0	1.02	34	26.9	22	48.09	15	21.1	29	7.81	15	35.1	35	46.88	20
30.9	1.43	41	24.8	21	48.28	19	18.4	27	8.12	31	31.8	33	47.11	23
Feb. 9.9	1.90	47	22.9	19	48.51	23	15.9	25	8.58	46	28.7	31	47.37	26
19.9	2.42	52	21.3	16	48.77	26	13.8	21	9.17	59	26.0	27	47.66	29
29.8	2.99	57	20.0	13	49.05	28	12.2	16	9.88	71	23.9	21	47.97	31
Mar. 10.8	3.58	59	18.9	11	49.36	31	11.0	12	10.67	79	22.3	16	48.29	32
20.8	4.19	61	18.1	8	49.68	32	10.4	6	11.52	85	21.3	10	48.63	34
30.8	4.81	62	17.6	5	50.00	32	10.4	0	12.39	87	21.0	3	48.97	34
Apr. 9.7	5.44	63	17.5	1	50.33	33	10.9	5	13.27	88	21.4	4	49.31	34
19.7	6.05	61	17.6	1	50.65	32	12.0	11	14.11	84	22.4	10	49.65	34
29.7	6.65	60	18.1	5	50.96	31	13.6	16	14.90	79	23.9	15	49.99	34
May 9.7	7.22	57	18.9	8	51.26	30	15.6	20	15.60	70	26.0	21	50.31	32
19.6	7.75	53	20.0	11	51.53	27	17.9	23	16.21	61	28.6	26	50.62	31
29.6	8.23	48	21.4	14	51.77	24	20.5	26	16.70	49	31.5	29	50.90	28
June 8.6	8.65	42	23.0	16	51.98	21	23.3	28	17.05	35	34.7	32	51.16	26
18.5	9.01	36	24.8	18	52.15	17	26.2	29	17.26	21	38.1	34	51.38	22
28.5	9.29	28	26.8	20	52.27	12	29.2	30	17.32	6	41.5	34	51.56	18
July 8.5	9.48	19	28.9	21	52.35	8	32.1	29	17.24	8	44.9	34	51.70	14
18.5	9.59	11	31.1	22	52.38	3	34.8	27	17.01	23	48.3	34	51.79	9
28.4	9.61	2	33.2	21	52.36	2	37.4	26	16.64	37	51.4	31	51.83	4
Aug. 7.4	9.54	7	35.2	20	52.29	7	39.7	23	16.13	51	54.3	29	51.83	0
17.4	9.39	15	37.1	19	52.18	11	41.7	20	15.50	63	56.9	26	51.78	5
27.4	9.17	22	38.8	17	52.03	15	43.4	17	14.77	73	59.1	22	51.68	10
Sept. 6.3	8.88	29	40.1	13	51.85	18	44.7	13	13.95	82	60.9	18	51.56	12
16.3	8.55	33	41.1	10	51.64	21	45.6	9	13.07	88	62.3	14	51.41	15
26.3	8.18	37	41.7	6	51.42	22	46.1	5	12.14	93	63.2	9	51.24	17
Oct. 6.2	7.80	38	41.8	1	51.19	23	46.2	1	11.18	96	63.5	3	51.06	18
16.2	7.43	37	41.5	3	50.97	22	45.9	3	10.22	96	63.3	2	50.89	17
26.2	7.09	34	40.8	7	50.76	21	45.1	8	9.29	93	62.6	7	50.73	16
Nov. 5.2	6.79	30	39.7	11	50.57	19	43.9	12	8.41	88	61.3	13	50.60	13
15.1	6.56	23	38.1	16	50.42	15	42.3	16	7.61	80	59.6	17	50.50	10
25.1	6.41	15	36.3	18	50.30	12	40.3	20	6.91	70	57.3	23	50.45	5
Dec. 5.1	6.34	7	34.2	21	50.23	7	37.9	24	6.33	58	54.6	27	50.44	1
15.1	6.36	2	31.9	23	50.21	2	35.3	26	5.89	44	51.6	30	50.48	4
25.0	6.48	12	29.6	23	50.24	3	32.5	28	5.60	29	48.3	33	50.57	9
35.0	6.69	21	27.2	24	50.31	7	29.5	30	5.48	12	44.8	35	50.70	13
Sec δ, Tan δ	2.151		−1.904		1.196		+0.656		3.949		+3.820		1.116	
Mean Place	$3^{s}.956$		$22''.18$		$49^{s}.845$		$35''.76$		$13^{s}.182$		$49''.53$		$48^{s}.514$	
$D'_{\psi}\alpha$, $D_{\omega}\alpha$	+0.05		+0.02		−0.02		−0.01		−0.10		−0.05		+0.01	
$D_{\psi}\delta$, $D_{\omega}\delta$	+0.1		−1.0		+0.1		−1.0		+0.1		−1.0		+0.1	

FOR THE UPPER TRANSIT AT WASHINGTON.

an Solar Date.	*o* **Draconis.** Mag. 4.8				*θ* **Serpentis** *pr.* Mag. 4.5				**R Lyræ.** Var. 4.0–4.7				*ε* **Aquilæ.** Mag. 4.2			
	Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination N.	
	h m 18 49		° ′ +59 16		h m 18 51		° ′ + 4 5		h m 18 52		° ′ +43 49		h m 18 55		° ′ +14 56	
	s		″		s		″		s		″		s		″	
n. 1.0	51.32		42.2		48.87		8.7		37.20		38.8		35.86		44.0	
11.0	51.38	6	38.6	36	49.00	13	7.1	16	37.29	9	35.6	32	35.97	11	41.8	22
21.0	51.52	14	35.2	34	49.16	16	5.6	15	37.42	13	32.4	32	36.12	15	39.7	21
30.9	51.73	21	31.8	34	49.36	20	4.1	15	37.61	19	29.3	31	36.31	19	37.7	20
b. 9.9	52.02	29	28.8	30	49.58	22	2.8	13	37.85	24	26.5	28	36.53	22	35.9	18
19.9	52.36	34	26.2	26	49.83	25	1.8	10	38.12	27	24.1	24	36.77	24	34.4	15
29.8	52.75	39	24.0	22	50.09	26	1.0	8	38.43	31	22.2	19	37.03	26	33.2	12
ar. 10.8	53.19	44	22.5	15	50.37	28	0.5	5	38.76	33	20.8	14	37.31	28	32.4	8
20.8	53.65	46	21.6	9	50.66	29	0.3	2	39.12	36	20.1	7	37.60	29	32.1	3
30.8	54.12	47	21.4	2	50.96	30	0.5	2	39.48	36	19.9	2	37.90	30	32.2	1
pr. 9.7	54.60	48	21.8	4	51.26	30	1.0	5	39.84	36	20.4	5	38.20	30	32.7	5
19.7	55.06	46	22.9	11	51.56	30	1.9	9	40.20	36	21.5	11	38.50	30	33.7	10
29.7	55.50	44	24.6	17	51.85	29	3.0	11	40.55	35	23.1	16	38.80	30	35.0	13
ay 9.7	55.91	41	26.8	22	52.14	29	4.4	14	40.87	32	25.2	21	39.08	28	36.6	16
19.6	56.27	36	29.4	26	52.41	27	5.9	15	41.16	29	27.6	24	39.35	27	38.5	19
29.6	56.58	31	32.3	29	52.65	24	7.6	17	41.42	26	30.4	28	39.59	24	40.5	20
une 8.6	56.82	24	35.5	32	52.86	21	9.3	17	41.64	22	33.5	31	39.80	21	42.7	22
18.5	57.00	18	38.9	34	53.05	19	11.0	17	41.82	18	36.7	32	39.99	19	45.0	23
28.5	57.10	10	42.4	35	53.20	15	12.8	18	41.94	12	39.9	32	40.13	14	47.2	22
uly 8.5	57.13	3	45.8	34	53.31	11	14.4	16	42.01	7	43.1	32	40.24	11	49.4	22
18.5	57.08	5	49.1	33	53.38	7	15.9	15	42.02	1	46.2	31	40.30	6	51.4	20
28.4	56.96	12	52.3	32	53.41	3	17.2	13	41.98	4	49.1	29	40.32	2	53.3	19
ug. 7.4	56.77	19	55.2	29	53.40	1	18.4	12	41.88	10	51.7	26	40.30	2	55.0	17
17.4	56.51	26	57.7	25	53.34	6	19.4	10	41.74	14	54.1	24	40.23	7	56.4	14
27.4	56.20	31	59.9	22	53.25	9	20.2	8	41.55	19	56.1	20	40.13	10	57.6	12
ept. 6.3	55.84	36	61.6	17	53.13	12	20.8	6	41.33	22	57.7	16	40.00	13	58.6	10
16.3	55.44	40	62.9	13	52.98	15	21.2	4	41.08	25	58.8	11	39.84	16	59.2	6
26.3	55.02	42	63.7	8	52.82	16	21.3	1	40.81	27	59.5	7	39.66	18	59.6	4
ct. 6.2	54.58	44	64.0	3	52.65	17	21.3	0	40.52	29	59.7	2	39.48	18	59.6	0
16.2	54.15	43	63.8	2	52.49	16	21.0	3	40.24	28	59.5	2	39.31	17	59.3	3
26.2	53.73	42	63.0	8	52.34	15	20.5	5	39.98	26	58.8	7	39.14	17	58.8	5
ov. 5.2	53.35	38	61.6	14	52.21	13	19.9	6	39.74	24	57.5	13	39.00	14	57.9	9
15.1	53.01	34	59.8	18	52.11	10	19.0	9	39.53	21	55.7	18	38.89	11	56.7	12
25.1	52.72	29	57.5	23	52.05	6	17.9	11	39.37	16	53.6	21	38.81	8	55.3	14
ec. 5.1	52.50	22	54.8	27	52.03	2	16.7	12	39.25	12	51.1	25	38.77	4	53.6	17
15.1	52.35	15	51.7	31	52.05	2	15.3	14	39.19	6	48.2	29	38.78	1	51.7	19
25.0	52.28	7	48.3	34	52.11	6	13.8	15	39.18	1	45.1	31	38.82	4	49.7	20
35.0	52.29	1	44.8	35	52.22	11	12.3	15	39.24	6	41.9	32	38.91	9	47.6	21
δ, Tan δ	1.958		+1.682		1.003		+0.072		1.386		+0.960		1.035		+0.267	
n Place	54ˢ.290		49″.96		50ˢ.671		18″.09		39ˢ.458		46″.95		37ˢ.691		53″.00	
α, D₀₀ α	−0.04		−0.02		0.00		0.00		−0.02		−0.01		−0.01		0.00	
δ, D₀₀ δ	+0.1		−1.0		+0.1		−1.0		+0.1		−1.0		+0.1		−1.0	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	**γ Lyræ.** Mag. 3.3				**ζ Sagittarii.** Mag. 2.7				**ζ Aquilæ.** Mag. 3.0				**λ Aquilæ.** Mag. 3.6			
	Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination S.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	18 55		+32 33		18 56		−30 0		19 1		+13 43		19 1		− 5 0	
	s		″		s		″		s		″		s		″	
Jan. 1.0	37.07	10	57.2	29	58.75	16	35.1	5	20.09	11	46.1	21	32.93	12	64.2	10
11.0	37.17	14	54.3	29	58.91	20	34.6	5	20.20	15	44.0	20	33.05	17	65.2	10
21.0	37.31	18	51.4	27	59.11	23	34.1	5	20.35	18	42.0	20	33.22	19	66.2	9
30.9	37.49	22	48.7	24	59.34	27	33.6	5	20.53	21	40.0	17	33.41	22	67.1	8
Feb. 9.9	37.71	25	46.3	21	59.61	29	33.1	5	20.74	23	38.3	15	33.63	25	67.9	7
19.9	37.96	28	44.2	17	59.90	31	32.6	5	20.97	26	36.8	11	33.88	26	68.6	4
29.8	38.24	30	42.5	12	60.21	33	32.1	5	21.23	28	35.7	7	34.14	28	69.0	2
Mar. 10.8	38.54	31	41.3	6	60.54	34	31.6	5	21.51	29	35.0	4	34.42	29	69.2	0
20.8	38.85	32	40.7	1	60.88	35	31.1	5	21.80	29	34.6	1	34.71	30	69.2	3
30.8	39.17	33	40.6	5	61.23	36	30.6	5	22.09	30	34.7	6	35.01	31	68.9	6
Apr. 9.7	39.50	32	41.1	10	61.59	35	30.1	5	22.39	30	35.3	9	35.32	30	68.3	8
19.7	39.82	32	42.1	15	61.94	35	29.6	4	22.69	30	36.2	13	35.62	30	67.5	10
29.7	40.14	30	43.6	19	62.29	34	29.2	4	22.99	29	37.5	16	35.92	30	66.5	11
May 9.7	40.44	27	45.5	23	62.63	32	28.8	2	23.28	27	39.1	18	36.22	28	65.4	12
19.6	40.71	25	47.8	26	62.95	30	28.6	2	23.55	25	40.9	20	36.50	26	64.2	13
29.6	40.96	22	50.4	28	63.25	27	28.4	0	23.80	22	42.9	22	36.76	23	62.9	14
June 8.6	41.18	18	53.2	29	63.52	23	28.4	0	24.02	18	45.1	22	36.99	20	61.5	13
18.5	41.36	13	56.1	29	63.75	19	28.4	2	24.20	16	47.3	22	37.19	17	60.2	12
28.5	41.49	9	59.0	29	63.94	15	28.6	4	24.36	11	49.5	21	37.36	13	59.0	12
July 8.5	41.58	4	61.9	27	64.09	11	29.0	4	24.47	7	51.6	20	37.49	8	57.8	10
18.5	41.62	1	64.6	26	64.20	5	29.4	5	24.54	2	53.6	18	37.57	5	56.8	9
28.4	41.61	6	67.2	24	64.25	0	29.9	6	24.56	2	55.4	17	37.62	0	55.9	7
Aug. 7.4	41.55	10	69.6	21	64.25	5	30.5	6	24.54	6	57.1	14	37.62	4	55.2	6
17.4	41.45	14	71.7	17	64.20	9	31.1	6	24.48	9	58.5	12	37.58	9	54.6	5
27.4	41.31	17	73.4	14	64.11	12	31.7	5	24.39	13	59.7	9	37.49	11	54.1	3
Sept. 6.3	41.14	20	74.8	10	63.99	15	32.2	5	24.26	15	60.6	7	37.38	13	53.8	1
16.3	40.94	22	75.8	6	63.84	18	32.7	3	24.11	17	61.3	4	37.25	16	53.7	1
26.3	40.72	22	76.4	2	63.66	19	33.0	3	23.94	18	61.7	0	37.09	16	53.6	1
Oct. 6.2	40.50	23	76.6	3	63.47	18	33.3	1	23.76	18	61.7	3	36.93	16	53.7	2
16.2	40.27	21	76.3	7	63.29	17	33.4	1	23.58	16	61.4	5	36.77	15	53.9	4
26.2	40.06	19	75.6	11	63.12	14	33.3	2	23.42	14	60.9	8	36.62	13	54.3	4
Nov. 5.2	39.87	15	74.5	15	62.98	10	33.1	3	23.28	11	60.1	11	36.49	9	54.7	6
15.1	39.72	12	73.0	19	62.88	6	32.8	4	23.17	8	59.0	14	36.40	7	55.3	7
25.1	39.60	8	71.1	23	62.82	2	32.4	5	23.09	4	57.6	16	36.33	2	56.0	8
Dec. 5.1	39.52	3	68.8	25	62.80	3	31.9	5	23.05	0	56.0	18	36.31	2	56.8	8
15.1	39.49	2	66.3	28	62.83	8	31.4	5	23.05	4	54.2	19	36.33	7	57.6	10
25.0	39.51	7	63.5	29	62.91	13	30.9	6	23.09	9	52.3	21	36.40	10	58.6	10
35.0	39.58		60.6		63.04		30.3		23.18		50.2		36.50		59.6	
Sec δ, Tan δ	1.187		+0.639		1.155		−0.577		1.029		+0.244		1.004		−0.087	
Mean Place	39ˢ.080		65″.63		60ˢ.794		24″.91		21ˢ.913		55″.06		34ˢ.733		54″.45	
D′ψ α, Dω α	−0.02		−0.01		+0.01		+0.01		−0.01		0.00		0.00		0.00	
Dψ δ, Dω δ	+0.1		−1.0		+0.1		−1.0		+0.1		−1.0		+0.1		−1.0	

FOR THE UPPER TRANSIT AT WASHINGTON.

ean Solar Date.	*α* Coronæ Australis. Mag. 4.1 Right Ascension.		Declination S.		*ι* Lyræ. Mag. 5.1 Right Ascension.		Declination N.		*π* Sagittarii. Mag. 3.0 Right Ascension.		Declination S.		*ψ* Sagittarii. Mag. 4.9 Right Ascension.		Declination S.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	19 3		−38 2		19 4		+35 57		19 4		−21 9		19 10		−25 24	
	s		″		s		″		s		″		s		″	
n. 1.0	26.94	17	43.9	10	7.64	8	34.0	30	29.96	14	61.7	0	6.78	14	43.7	2
11.0	27.11	20	42.9	10	7.72	13	31.0	30	30.10	18	61.7	0	6.92	17	43.5	3
21.0	27.31	25	41.9	10	7.85	17	28.0	28	30.28	21	61.7	0	7.09	21	43.2	3
30.9	27.56	28	40.9	10	8.02	21	25.2	26	30.49	24	61.7	1	7.30	25	42.9	3
b. 9.9	27.84	31	39.9	9	8.23	25	22.6	23	30.73	26	61.6	1	7.55	27	42.6	4
19.9	28.15	34	39.0	8	8.48	28	20.3	18	30.99	29	61.5	2	7.82	29	42.2	5
29.9	28.49	36	38.2	8	8.76	30	18.5	13	31.28	30	61.3	3	8.11	31	41.7	5
ar. 10.8	28.85	37	37.4	7	9.06	32	17.2	7	31.58	31	61.0	4	8.42	32	41.2	5
20.8	29.22	38	36.7	7	9.38	33	16.5	1	31.89	33	60.6	5	8.74	34	40.7	6
30.8	29.60	39	36.0	5	9.71	33	16.4	4	32.22	33	60.1	6	9.08	34	40.1	6
r. 9.7	29.99	39	35.5	5	10.04	33	16.8	9	32.55	33	59.5	6	9.42	34	39.5	6
19.7	30.38	38	35.0	3	10.37	33	17.7	15	32.88	32	58.9	7	9.76	34	38.9	7
29.7	30.76	37	34.7	1	10.70	31	19.2	20	33.20	32	58.2	7	10.10	33	38.2	6
ay 9.7	31.13	35	34.6	0	11.01	29	21.2	23	33.52	31	57.5	7	10.43	31	37.6	5
19.6	31.48	33	34.6	1	11.30	26	23.5	26	33.83	28	56.8	6	10.74	30	37.1	5
29.6	31.81	30	34.7	3	11.56	22	26.1	29	34.11	26	56.2	6	11.04	27	36.6	3
ne 8.6	32.11	26	35.0	5	11.78	19	29.0	30	34.37	22	55.6	4	11.31	24	36.3	3
18.6	32.37	22	35.5	6	11.97	14	32.0	30	34.59	19	55.2	4	11.55	20	36.0	1
28.5	32.59	16	36.1	8	12.11	9	35.0	30	34.78	15	54.8	2	11.75	16	35.9	0
ly 8.5	32.75	12	36.9	9	12.20	5	38.0	29	34.93	10	54.6	1	11.91	11	35.9	1
18.5	32.87	6	37.8	10	12.25	1	40.9	28	35.03	5	54.5	0	12.02	6	36.0	3
28.4	32.93	1	38.8	10	12.24	6	43.7	25	35.08	1	54.5	1	12.08	1	36.3	3
ug. 7.4	32.94	5	39.8	10	12.18	10	46.2	22	35.09	3	54.6	2	12.09	3	36.6	4
17.4	32.89	10	40.8	9	12.08	14	48.4	19	35.06	8	54.8	2	12.06	8	37.0	4
27.4	32.79	14	41.7	8	11.94	18	50.3	16	34.98	11	55.0	3	11.98	11	37.4	5
pt. 6.3	32.65	17	42.5	7	11.76	21	51.9	11	34.87	14	55.3	3	11.87	14	37.9	4
16.3	32.48	19	43.2	5	11.55	23	53.0	7	34.73	16	55.6	2	11.73	17	38.3	3
26.3	32.29	20	43.7	3	11.32	24	53.7	3	34.57	17	55.8	2	11.56	17	38.6	3
t. 6.3	32.09	20	44.0	1	11.08	23	54.0	1	34.40	17	56.0	2	11.39	17	38.9	1
16.2	31.89	18	44.1	1	10.85	23	53.9	6	34.23	15	56.2	1	11.22	16	39.0	1
26.2	31.71	17	44.0	4	10.62	20	53.3	11	34.08	14	56.3	1	11.06	14	39.1	0
ov. 5.2	31.54	13	43.6	5	10.42	17	52.2	15	33.94	10	56.4	0	10.92	11	39.1	1
15.1	31.41	8	43.1	7	10.25	14	50.7	19	33.84	6	56.4	0	10.81	7	39.0	1
25.1	31.33	3	42.4	9	10.11	9	48.8	23	33.78	2	56.4	0	10.74	3	38.9	2
ec. 5.1	31.30	2	41.5	10	10.02	5	46.5	26	33.76	2	56.4	0	10.71	2	38.7	3
15.1	31.32	8	40.5	10	9.97	0	43.9	28	33.78	7	56.4	0	10.73	7	38.4	3
25.0	31.40	14	39.5	11	9.97	5	41.1	29	33.85	12	56.4	0	10.80	11	38.1	3
35.0	31.54		38.4		10.02		38.2		33.97		56.4		10.91		37.8	
δ, Tan δ	1.270		−0.782		1.235		+0.726		1.072		−0.387		1.107		−0.475	
n Place	$29^{s}.141$		33″.23		$9^{s}.714$		41″.87		$31^{s}.868$		51″.35		$8^{s}.728$		33″.04	
a, $D_{\omega}a$	+0.02		+0.01		−0.02		−0.01		+0.01		+0.01		+0.01		+0.01	
, $D_{\omega}\delta$	+0.1		−1.0		+0.1		−1.0		+0.1		−1.0		+0.1		−1.0	

Mean Solar Date.	*d* Sagittarii.				δ Draconis.				θ Lyræ.				ω Aquilæ.			
	Mag. 5.0				Mag. 3.2				Mag. 4.5				Mag. 5.1			
	Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination N.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	19 12		−19 6		19 12		+67 29		19 13		+37 58		19 13		+11	
	s		″		s		″		s		″		s		″	
Jan. 1.0	27.33		47.6		28.41		78.4		16.66		28.3		39.35		60.8	
11.0	27.46	13	47.7	1	28.38	3	74.9	35	16.73	7	25.3	30	39.45	10	58.9	
21.0	27.62	16	47.8	1	28.46	8	71.4	35	16.84	11	22.3	30	39.58	13	57.0	
30.9	27.82	20	47.8	0	28.65	19	68.0	34	17.00	16	19.4	29	39.75	17	55.2	
Feb. 9.9	28.05	23	47.8	0	28.94	29	64.8	32	17.21	21	16.7	27	39.95	20	53.6	
19.9	28.31	26	47.7	1	29.32	38	62.0	28	17.45	24	14.4	23	40.18	23	52.2	
29.9	28.59	28	47.6	1	29.78	46	59.6	24	17.72	27	12.5	19	40.43	25	51.2	
Mar. 10.8	28.88	29	47.3	3	30.30	52	57.8	18	18.02	30	11.1	14	40.70	27	50.5	
20.8	29.19	31	46.9	4	30.87	57	56.6	12	18.34	32	10.2	9	40.98	28	50.2	
30.8	29.51	32	46.3	6	31.47	60	56.1	5	18.68	34	10.0	2	41.27	29	50.3	
Apr. 9.7	29.83	32	45.7	6	32.08	61	56.2	1	19.02	34	10.3	3	41.58	31	50.8	
19.7	30.15	32	45.0	7	32.68	60	57.0	8	19.36	34	11.2	9	41.88	30	51.7	
29.7	30.48	33	44.2	8	33.25	57	58.4	14	19.69	33	12.7	15	42.18	30	53.0	
May 9.7	30.80	32	43.4	8	33.79	54	60.3	19	20.01	32	14.6	19	42.47	29	54.[illegible]	
19.6	31.10	30	42.6	8	34.27	48	62.7	24	20.31	30	16.9	23	42.74	27	56.3	
29.6	31.38	28	41.9	7	34.68	41	65.5	28	20.58	27	19.5	26	43.00	26	58.3	
June 8.6	31.64	26	41.2	7	35.00	32	68.7	32	20.82	24	22.4	29	43.23	23	60.3	
18.6	31.87	23	40.6	6	35.24	24	72.0	33	21.02	20	25.4	30	43.43	20	62.4	21
28.5	32.07	20	40.1	5	35.39	15	75.5	35	21.17	15	28.5	31	43.60	17	64.6	22
July 8.5	32.22	15	39.7	4	35.43	4	79.0	35	21.27	10	31.6	31	43.72	12	66.7	21
18.5	32.33	11	39.5	2	35.38	5	82.5	35	21.32	5	34.6	30	43.81	9	68.6	19
28.4	32.39	6	39.3	2	35.23	15	85.9	34	21.31	1	37.4	28	43.85	4	70.4	18
Aug. 7.4	32.40	1	39.3	0	34.98	25	89.0	31	21.26	5	40.1	27	43.84	1	72.0	16
17.4	32.37	3	39.4	1	34.65	33	91.8	28	21.16	10	42.5	24	43.80	4	73.4	14
27.4	32.30	7	39.6	2	34.24	41	94.3	25	21.02	14	44.5	20	43.71	9	74.5	11
Sept. 6.3	32.19	11	39.8	2	33.76	48	96.4	21	20.84	18	46.2	17	43.59	12	75.4	9
16.3	32.05	14	40.0	2	33.22	54	98.1	17	20.63	21	47.5	13	43.45	14	76.1	7
26.3	31.90	15	40.2	2	32.65	57	99.3	12	20.40	23	48.4	9	43.29	16	76.5	4
Oct. 6.3	31.74	16	40.4	2	32.05	60	100.0	7	20.15	25	48.8	4	43.12	17	76.6	1
16.2	31.58	16	40.6	2	31.45	60	100.1	1	19.91	24	48.7	1	42.94	18	76.4	2
26.2	31.42	16	40.8	2	30.86	59	99.7	4	19.67	24	48.2	5	42.78	16	76.0	4
Nov. 5.2	31.29	13	41.0	2	30.30	56	98.8	9	19.45	22	47.2	10	42.64	14	75.3	7
15.1	31.18	11	41.1	1	29.78	52	97.3	15	19.26	19	45.8	14	42.52	12	74.3	10
25.1	31.11	7	41.2	1	29.32	46	95.3	20	19.11	15	43.9	19	42.44	8	73.0	13
Dec. 5.1	31.09	2	41.3	1	28.94	38	92.8	25	19.00	11	41.7	22	42.39	5	71.6	14
15.1	31.11	2	41.4	1	28.65	29	89.9	29	18.94	6	39.1	26	42.38	1	70.0	16
25.0	31.17	6	41.5	1	28.46	19	86.7	32	18.93	1	36.3	28	42.42	4	68.2	18
35.0	31.27	10	41.6	1	28.37	9	83.3	34	18.97	4	33.3	30	42.50	8	66.3	19
Sec δ, Tan δ	1.059		−0.347		2.614		+2.415		1.269		+0.780		1.020		+0.202	
Mean Place	29ˢ.203		37″.03		32ˢ.302		84″.21		18ˢ.784		35″.60		41ˢ.157		69″.70	
D′ψ α, Dω α	+0.01		+0.01		−0.06		−0.05		−0.02		−0.02		−0.01		0.00	
Dψ δ, Dω δ	+0.1		−1.0		+0.1		−1.0		+0.1		−0.9		+0.1		−0.9	

ar	κ Cygni. Mag. 4.0				τ Draconis. Mag. 4.6				δ Aquilæ. Mag. 3.4				β Cygni. Mag. 3.2			
	Right Ascension.		Declination N.		Right Ascension		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination N.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	19 15		+53 11		19 17		+73 11		19 21		+ 2 56		19 27		+27 46	
	s		″		s		″		s		″		s		″	
.0	1.53		74.4		10.18		27.6		1.91		9.7		8.38		19.9	
.0	1.56	3	71.0	34	10.09	9	24.1	35	2.01	10	8.2	15	8.45	7	17.2	27
.0	1.66	10	67.6	34	10.14	5	20.6	35	2.15	14	6.8	14	8.56	11	14.6	26
.9	1.83	17	64.3	33	10.34	20	17.1	35	2.32	17	5.5	13	8.71	15	12.1	25
.9	2.05	22	61.2	31	10.67	33	13.9	32	2.52	20	4.4	11	8.90	19	9.8	23
.9	2.33	28	58.5	27	11.13	46	11.1	28	2.74	22	3.4	10	9.11	21	7.8	20
.9	2.65	32	56.3	22	11.69	56	8.6	25	2.99	25	2.7	7	9.36	25	6.1	17
.8	3.02	37	54.7	16	12.34	65	6.7	19	3.26	27	2.3	4	9.63	27	4.9	12
.8	3.41	39	53.6	11	13.06	72	5.4	13	3.54	28	2.2	1	9.92	29	4.2	7
.8	3.82	41	53.1	5	13.82	76	4.8	6	3.83	29	2.4	2	10.23	31	4.0	2
.8	4.24	42	53.3	2	14.60	78	4.8	0	4.13	30	3.0	6	10.54	31	4.3	3
.7	4.66	42	54.2	9	15.37	77	5.5	7	4.43	30	3.9	9	10.86	32	5.2	9
.7	5.07	41	55.6	14	16.10	73	6.8	13	4.73	30	5.1	12	11.18	32	6.5	13
.7	5.45	38	57.6	20	16.78	68	8.7	19	5.03	30	6.5	14	11.49	31	8.2	17
.6	5.80	35	60.0	24	17.39	61	11.0	23	5.31	28	8.0	15	11.78	29	10.3	21
.6	6.11	31	62.8	28	17.90	51	13.7	27	5.58	27	9.7	17	12.05	27	12.7	24
.6	6.37	26	65.9	31	18.30	40	16.8	31	5.82	24	11.4	17	12.29	24	15.3	26
.6	6.58	21	69.2	33	18.59	29	20.1	33	6.03	21	13.2	18	12.50	21	18.1	28
.5	6.73	15	72.6	34	18.75	16	23.6	35	6.21	18	14.9	17	12.67	17	20.9	28
.5	6.82	9	76.1	35	18.78	3	27.1	35	6.35	14	16.6	17	12.79	12	23.7	28
.5	6.84	2	79.4	33	18.68	10	30.6	35	6.45	10	18.1	15	12.87	8	26.4	27
.5	6.79	5	82.6	32	18.46	22	33.9	33	6.50	5	19.5	14	12.90	3	29.0	26
.4	6.68	11	85.7	31	18.11	35	37.1	32	6.51	1	20.7	12	12.89	1	31.4	24
.4	6.51	17	88.4	27	17.65	46	40.0	29	6.48	3	21.7	10	12.83	6	33.5	21
.4	6.28	23	90.8	24	17.08	57	42.6	26	6.41	7	22.5	8	12.73	10	35.3	18
.3	6.01	27	92.8	20	16.43	65	44.8	22	6.30	11	23.2	7	12.59	14	36.8	15
.3	5.70	31	94.3	15	15.71	72	46.6	18	6.17	13	23.6	4	12.42	17	38.0	12
.3	5.37	33	95.4	11	14.93	78	47.9	13	6.02	15	23.8	2	12.23	19	38.8	8
.3	5.02	35	96.0	6	14.12	81	48.7	8	5.86	16	23.9	1	12.03	20	39.2	4
.2	4.67	35	96.1	1	13.29	83	48.9	2	5.70	16	23.7	2	11.83	20	39.2	0
.2	4.32	35	95.6	5	12.48	81	48.6	3	5.55	15	23.3	4	11.63	20	38.8	4
.2	4.00	32	94.6	10	11.70	78	47.8	8	5.41	14	22.8	5	11.45	18	38.0	8
.2	3.71	29	93.2	14	10.97	73	46.4	14	5.30	11	22.0	8	11.29	16	36.9	11
.1	3.46	25	91.2	20	10.32	65	44.5	19	5.22	8	21.1	9	11.17	12	35.3	16
.1	3.26	20	88.7	25	9.76	56	42.2	23	5.18	4	20.0	11	11.08	9	33.4	19
.1	3.12	14	85.9	28	9.32	44	39.4	28	5.18	0	18.8	12	11.03	5	31.2	22
.0	3.05	7	82.8	31	9.00	32	36.3	31	5.22	4	17.5	13	11.03	0	28.8	24
.0	3.05	0	79.5	33	8.82	18	32.9	34	5.29	7	16.1	14	11.07	4	26.3	25
ı δ	1.670		+1.337		3.458		+3.310		1.001		+0.051		1.130		+0.527	
ce	$4^{s}.191$		80″.63		$15^{s}.213$		32″.69		$3^{s}.694$		19″.04		$10^{s}.332$		27″.20	
a	−0.03		−0.03		−0.08		−0.07		0.00		0.00		−0.01		−0.01	
δ	+0.1		−0.9		+0.1		−0.9		+0.1		−0.9		+0.1		−0.9	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	ι Cygni. Mag. 3.9				μ Aquilæ. Mag. 4.6				h Sagittarii. Mag. 4.7				κ Aquilæ. Mag. 5.0			
	Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination S.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	19 27		+51 32		19 29		+ 7 11		19 31		−25 4		19 32		− 7 13	
	s		″		s		″		s		″		s		″	
Jan. 1.0	26.68		25.4		45.68		20.6		19.30		54.5		7.72		35.6	
11.0	26.70	2	22.1	33	45.76	8	18.9	17	19.41	11	54.2	3	7.82	10	36.4	8
21.0	26.78	8	18.7	34	45.89	13	17.3	16	19.57	16	53.8	4	7.95	13	37.1	7
31.0	26.92	14	15.5	32	46.05	16	15.8	15	19.76	19	53.4	4	8.12	17	37.8	7
Feb. 9.9	27.12	20	12.4	31	46.24	19	14.4	14	19.98	22	53.0	4	8.32	20	38.4	6
19.9	27.38	26	9.7	27	46.45	21	13.2	12	20.23	25	52.5	5	8.54	22	38.8	4
29.9	27.68	30	7.4	23	46.69	24	12.3	9	20.50	27	51.9	6	8.79	25	39.1	3
Mar. 10.8	28.02	34	5.7	17	46.95	26	11.8	5	20.80	30	51.3	6	9.05	26	39.1	0
20.8	28.40	38	4.5	12	47.22	27	11.6	2	21.11	31	50.6	7	9.33	28	38.9	2
30.8	28.79	39	4.0	5	47.51	29	11.8	2	21.44	33	49.9	7	9.63	30	38.5	4
Apr. 9.8	29.20	41	4.1	1	47.81	30	12.3	5	21.77	33	49.1	8	9.93	30	37.8	7
19.7	29.60	40	4.8	7	48.12	31	13.2	9	22.11	34	48.3	8	10.24	31	36.9	9
29.7	30.00	40	6.1	13	48.42	30	14.4	12	22.45	34	47.5	8	10.55	31	35.8	11
May 9.7	30.39	39	8.0	19	48.72	30	15.8	14	22.79	34	46.7	8	10.86	31	34.6	12
19.7	30.74	35	10.3	23	49.00	28	17.5	17	23.12	33	45.9	8	11.15	29	33.3	13
29.6	31.06	32	13.0	27	49.27	27	19.3	18	23.43	31	45.3	6	11.43	28	32.0	13
June 8.6	31.34	28	16.0	30	49.52	25	21.2	19	23.71	28	44.8	5	11.69	26	30.7	13
18.6	31.56	22	19.3	33	49.73	21	23.2	20	23.97	26	44.4	4	11.92	23	29.4	13
28.5	31.73	17	22.7	34	49.92	19	25.2	20	24.19	22	44.2	2	12.12	20	28.1	13
July 8.5	31.83	10	26.2	35	50.06	14	27.1	19	24.36	17	44.1	1	12.28	16	27.0	11
18.5	31.87	4	29.5	33	50.16	10	28.9	18	24.49	13	44.1	0	12.39	11	26.0	10
28.5	31.85	2	32 8	33	50.22	6	30.5	16	24.58	9	44.3	2	12.46	7	25.2	8
Aug. 7.4	31.77	8	35.9	31	50.23	1	32.0	15	24.61	3	44.6	3	12.49	3	24.5	7
17.4	31.63	14	38.7	28	50.21	2	33.2	12	24.60	1	45.0	4	12.48	1	23.9	6
27.4	31.43	20	41.2	25	50.14	7	34.3	11	24.54	6	45.4	4	12.42	6	23.5	4
Sept. 6.4	31.18	25	43.3	21	50.04	10	35.1	8	24.44	10	45.9	5	12.32	10	23.3	2
16.3	30.90	28	45.0	17	49.91	13	35.7	6	24.31	13	46.4	5	12.20	12	23.2	1
26.3	30.59	31	46.2	12	49.76	15	36.0	3	24.16	15	46.8	4	12.06	14	23.2	0
Oct. 6.3	30.26	33	46.9	7	49.59	17	36.1	1	23.99	17	47.2	4	11.91	15	23.3	1
16.2	29.93	33	47.2	3	49.43	16	36.0	1	23.82	17	47.4	2	11.75	16	23.5	2
26.2	29.60	33	46.9	3	49.27	16	35.6	4	23.66	16	47.6	2	11.60	15	23.8	3
Nov. 5.2	29.28	32	46.1	8	49.13	14	35.0	6	23.51	15	47.7	1	11.46	14	24.2	4
15.2	29.00	28	44.7	14	49.01	12	34.2	8	23.39	12	47.7	0	11.35	11	24.6	4
25.1	28.76	24	42.9	18	48.92	9	33.2	10	23.31	8	47.6	1	11.27	8	25.2	6
Dec. 5.1	28.57	19	40.6	23	48.87	5	32.0	12	23.26	5	47.4	2	11.23	4	25.8	6
15.1	28.43	14	37.9	27	48.86	1	30.6	14	23.26	0	47.2	2	11.22	1	26.5	7
25.1	28.34	9	35.0	29	48.88	2	29.0	16	23.31	5	46.9	3	11.26	4	27.3	8
35.0	28.32	2	31.8	32	48.95	7	27.4	16	23.39	8	46.6	3	11.34	8	28.0	7
Sec δ, Tan δ	1.607		+1.259		1.008		+0.127		1.104		−0.468		1.008		−0.127	
Mean Place	$29^{s}.269$		$30''.91$		$47^{s}.457$		$29''.51$		$21^{s}.193$		$43''.02$		$9^{s}.494$		$25''.43$	
$D'_{\psi}\,a$, $D_{\omega}\,a$	−0.03		−0.03		0.00		0.00		+0.01		+0.01		0.00		0.00	
$D_{\psi}\,\delta$, $D_{\omega}\,\delta$	+0.1		−0.9		+0.2		−0.9		+0.2		−0.9		+0.2		−0.9	

FOR THE UPPER TRANSIT AT WASHINGTON.

ar	**θ Cygni.** Mag. 4.6				**54 Sagittarii.** Mag. 5.4				**β Sagittæ.** Mag. 4.4				**15 Cygni.** Mag. 5.0			
	Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination N.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	19 34		+50 0		19 35		−16 29		19 37		+17 15		19 41		+37 8	
	s		″		s		″		s		″		s		″	
.0	2.39	2	55.6	32	39.17	10	55.7	2	3.95	7	69.6	21	4.10	3	23.1	29
.0	2.41	7	52.4	33	39.27	14	55.9	2	4.02	11	67.5	21	4.13	9	20.2	29
.0	2.48	14	49.1	33	39.41	17	56.1	1	4.13	14	65.4	20	4.22	13	17.3	28
.0	2.62	19	45.8	30	39.58	21	56.2	1	4.27	18	63.4	19	4.35	17	14.5	27
.9	2.81	24	42.8	27	39.79	23	56.3	1	4.45	20	61.5	16	4.52	21	11.8	24
.9	3.05	28	40.1	23	40.02	25	56.2	2	4.65	23	59.9	13	4.73	25	9.4	20
.9	3.33	33	37.8	18	40.27	28	56.0	4	4.88	26	58.6	9	4.98	28	7.4	16
.8	3.66	36	36.0	12	40.55	29	55.6	5	5.14	28	57.7	5	5.26	30	5.8	10
.8	4.02	38	34.8	6	40.84	31	55.1	6	5.42	29	57.2	0	5.56	32	4.8	4
.8	4.40	40	34.2	1	41.15	31	54.5	7	5.71	30	57.2	4	5.88	34	4.4	2
.8	4.80	40	34.3	7	41.46	32	53.8	9	6.01	30	57.6	9	6.22	34	4.6	7
.7	5.20	39	35.0	12	41.78	33	52.9	10	6.31	31	58.5	12	6.56	34	5.3	12
.7	5.59	38	36.2	18	42.11	32	51.9	10	6.62	30	59.7	16	6.90	34	6.5	17
.7	5.97	35	38.0	23	42.43	31	50.9	10	6.92	29	61.3	19	7.24	31	8.2	22
.7	6.32	32	40.3	27	42.74	29	49.9	10	7.21	27	63.2	22	7.55	29	10.4	25
.6	6.64	28	43.0	30	43.03	28	48.9	9	7.48	25	65.4	23	7.84	27	12.9	28
.6	6.92	23	46.0	32	43.31	24	48.0	9	7.73	22	67.7	24	8.11	22	15.7	30
.6	7.15	18	49.2	34	43.55	21	47.1	7	7.95	18	70.1	24	8.33	18	18.7	31
.5	7.33	11	52.6	35	43.76	17	46.4	6	8.13	14	72.5	24	8.51	14	21.8	31
.5	7.44	6	56.1	33	43.93	13	45.8	5	8.27	10	74.9	23	8.65	9	24.9	31
.5	7.50	1	59.4	33	44.06	8	45.3	3	8.37	6	77.2	21	8.74	3	28.0	30
.5	7.49	7	62.7	31	44.14	3	45.0	2	8.43	1	79.3	20	8.77	2	31.0	28
.4	7.42	12	65.8	28	44.17	1	44.8	1	8.44	4	81.3	17	8.75	7	33.8	25
.4	7.30	18	68.6	26	44.16	5	44.7	1	8.40	7	83.0	15	8.68	12	36.3	23
.4	7.12	23	71.2	21	44.11	9	44.8	1	8.33	11	84.5	12	8.56	15	38.6	19
.4	6.89	27	73.3	17	44.02	12	44.9	2	8.22	14	85.7	10	8.41	19	40.5	15
.3	6.62	29	75.0	13	43.90	14	45.1	2	8.08	16	86.7	6	8.22	21	42.0	11
.3	6.33	31	76.3	8	43.76	16	45.3	2	7.92	17	87.3	3	8.01	23	43.1	7
.3	6.02	32	77.1	4	43.60	16	45.5	3	7.75	18	87.6	0	7.78	24	43.8	3
.2	5.70	32	77.5	2	43.44	16	45.8	3	7.57	17	87.6	3	7.54	23	44.1	2
.2	5.38	30	77.3	8	43.28	14	46.1	3	7.40	16	87.3	6	7.31	22	43.9	7
.2	5.08	27	76.5	12	43.14	11	46.4	2	7.24	14	86.7	10	7.09	20	43.2	12
.2	4.81	23	75.3	17	43.03	8	46.6	2	7.10	10	85.7	13	6.89	16	42.0	15
.1	4.58	19	73.6	22	42.95	5	46.8	2	7.00	7	84.4	15	6.73	13	40.5	20
.1	4.39	14	71.4	26	42.90	0	47.0	3	6.93	4	82.9	18	6.60	9	38.5	23
.1	4.25	8	68.8	30	42.90	4	47.3	2	6.89	1	81.1	19	6.51	4	36.2	26
.1	4.17	3	65.8	31	42.94	8	47.5	2	6.90	4	79.2	20	6.47	1	33.6	28
.0	4.14		62.7		43.02		47.7		6.94		77.2		6.48		30.8	
n δ	1.557		+1.193		1.043		−0.296		1.048		+0.311		1.254		+0.757	
ce	4^{s}.919		60″.78		40^{s}.973		44″.78		5^{s}.774		77″.58		6^{s}.213		28″.97	
a	−0.03		−0.03		+0.01		+0.01		−0.01		−0.01		−0.02		−0.02	
δ	+0.2		−0.9		+0.2		−0.9		+0.2		−0.9		+0.2		−0.9	

Mean Solar Date.	*f* Sagittarii. Mag. 5.1				*γ* Aquilæ. Mag. 2.8				*δ* Cygni. Mag. 3.0				*δ* Sagittæ. Mag. 3.8			
	Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination	
	h m 19 41		° ′ −19 58		h m 19 42		° ′ +10 23		h m 19 42		° ′ +44 54		h m 19 43		° +18	
	s		″		s		″		s		″		s		″	
Jan. 1.0	11.97	10	35.4	0	2.78	7	44.8	18	11.19	2	50.7	31	26.01	6	52.1	
11.0	12.07	14	35.4	1	2.85	11	43.0	17	11.21	7	47.6	32	26.07	10	50.0	
21.0	12.21	17	35.3	1	2.96	14	41.3	17	11.28	12	44.4	31	26.17	14	47.8	
31.0	12.38	20	35.2	2	3.10	18	39.6	15	11.40	17	41.3	29	26.31	17	45.8	
Feb. 9.9	12.58	23	35.0	3	3.28	20	38.1	13	11.57	23	38.4	26	26.48	20	43.9	
19.9	12.81	26	34.7	4	3.48	23	36.8	10	11.80	26	35.8	22	26.68	23	42.2	
29.9	13.07	27	34.3	5	3.71	25	35.8	6	12.06	29	33.6	17	26.91	25	40.9	
Mar. 10.9	13.34	30	33.8	6	3.96	27	35.2	3	12.35	33	31.9	12	27.16	27	39.9	
20.8	13.64	31	33.2	7	4.23	29	34.9	1	12.68	35	30.7	6	27.43	29	39.4	
30.8	13.95	32	32.5	9	4.52	29	35.0	5	13.03	37	30.1	0	27.72	30	39.3	
Apr. 9.8	14.27	33	31.6	9	4.81	31	35.5	8	13.40	37	30.1	7	28.02	31	39.7	
19.7	14.60	33	30.7	9	5.12	30	36.3	12	13.77	37	30.8	12	28.33	31	40.6	
29.7	14.93	33	29.8	10	5.42	30	37.5	15	14.14	36	32.0	17	28.64	30	41.8	
May 9.7	15.26	32	28.8	9	5.72	29	39.0	18	14.50	34	33.7	22	28.94	30	43.4	
19.7	15.58	30	27.9	9	6.01	28	40.8	19	14.84	31	35.9	26	29.24	28	45.3	
29.6	15.88	28	27.0	9	6.29	25	42.7	21	15.15	28	38.5	29	29.52	25	47.4	
June 8.6	16.16	26	26.1	7	6.54	22	44.8	22	15.43	23	41.4	32	29.77	22	49.8	
18.6	16.42	22	25.4	6	6.76	19	47.0	21	15.66	18	44.6	32	29.99	19	52.2	
28.6	16.64	17	24.8	4	6.95	16	49.1	21	15.84	13	47.8	33	30.18	14	54.7	
July 8.5	16.81	14	24.4	2	7.11	11	51.2	20	15.97	8	51.1	33	30.32	11	57.2	24
18.5	16.95	9	24.2	2	7.22	6	53.2	18	16.05	2	54.4	32	30.43	6	59.6	22
28.5	17.04	4	24.0	0	7.28	3	55.0	17	16.07	4	57.6	30	30.49	1	61.8	20
Aug. 7.4	17.08	0	24.0	2	7.31	2	56.7	14	16.03	9	60.6	28	30.50	3	63.8	18
17.4	17.08	5	24.2	2	7.29	6	58.1	12	15.94	14	63.4	25	30.47	7	65.6	16
27.4	17.03	9	24.4	3	7.23	10	59.3	10	15.80	19	65.9	21	30.40	10	67.2	13
Sept. 6.4	16.94	12	24.7	3	7.13	13	60.3	8	15.61	23	68.0	17	30.30	14	68.5	10
16.3	16.82	15	25.0	3	7.00	15	61.1	5	15.38	25	69.7	13	30.16	16	69.5	7
26.3	16.67	16	25.3	4	6.85	16	61.6	2	15.13	27	71.0	8	30.00	17	70.2	4
Oct. 6.3	16.51	16	25.7	3	6.69	17	61.8	1	14.86	28	71.8	4	29.83	18	70.6	0
16.3	16.35	16	26.0	2	6.52	16	61.7	3	14.58	27	72.2	2	29.65	18	70.6	3
26.2	16.19	14	26.2	2	6.36	15	61.4	6	14.31	26	72.0	6	29.47	16	70.3	6
Nov. 5.2	16.05	12	26.4	2	6.21	12	60.8	8	14.05	24	71.4	12	29.31	14	69.7	9
15.2	15.93	9	26.6	1	6.09	10	60.0	11	13.81	21	70.2	16	29.17	11	68.8	13
25.1	15.84	5	26.7	1	5.99	7	58.9	13	13.60	16	68.6	21	29.06	8	67.5	15
Dec. 5.1	15.79	1	26.8	0	5.92	2	57.6	14	13.44	12	66.5	24	28.98	4	66.0	17
15.1	15.78	4	26.8	0	5.90	1	56.2	16	13.32	7	64.1	28	28.94	0	64.3	
25.1	15.82	7	26.8	0	5.91	5	54.6	17	13.25	1	61.3	30	28.94	4	62.3	21
35.0	15.89		26.8		5.96		52.9		13.24		58.3		28.98		60.2	
Sec δ, Tan δ	1.064		−0.364		1.016		+0.183		1.412		+0.997		1.053		+0.331	
Mean Place	$13^s.788$		$24''.02$		$4^s.558$		$53''.27$		$13^s.517$		$55''.75$		$27^s.840$		$59''.76$	
D′ψ α, Dω α	+0.01		+0.01		0.00		−0.01		−0.02		−0.03		−0.01		−0.01	
Dψ δ, Dω δ	+0.2		−0.9		+0.2		−0.9		+0.2		−0.9		+0.2		−0.9	

FOR THE UPPER TRANSIT AT WASHINGTON.

an Solar Date.	**α Aquilæ.** Mag. 0.9				**η Aquilæ.** Var. 3.7–4.4				**ε Draconis.** Mag. 4.0				**ι Sagittarii.** Mag. 4.2			
	Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination S.	
	h m 19 46 s		° ′ + 8 37 ″		h m 19 47 s		° ′ + 0 46 ″		h m 19 48 s		° ′ +70 2 ″		h m 19 49 s		° ′ −42 5 ″	
n. 1.0	27.62	7	58.1	16	57.70	7	35.4	12	24.28	14	34.9	33	9.36	11	74.3	14
11.0	27.69	11	56.5	16	57.77	11	34.2	12	24.14	2	31.6	35	9.47	16	72.9	14
21.0	27.80	14	54.9	16	57.88	15	33.0	11	24.12	10	28.1	34	9.63	20	71.5	15
31.0	27.94	18	53.3	14	58.03	17	31.9	10	24.22	22	24.7	33	9.83	24	70.0	15
eb. 9.9	28.12	20	51.9	11	58.20	21	30.9	8	24.44	32	21.4	31	10.07	28	68.5	15
19.9	28.32	22	50.8	9	58.41	23	30.1	5	24.76	43	18.3	26	10.35	31	67.0	14
29.9	28.54	25	49.9	6	58.64	24	29.6	3	25.19	51	15.7	22	10.66	34	65.6	14
ar. 10.9	28.79	27	49.3	2	58.88	27	29.3	0	25.70	58	13.5	16	11.00	36	64.2	13
20.8	29.06	28	49.1	1	59.15	29	29.3	3	26.28	63	11.9	10	11.36	38	62.9	12
30.8	29.34	30	49.2	5	59.44	29	29.6	6	26.91	67	10.9	4	11.74	40	61.7	11
pr. 9.8	29.64	30	49.7	9	59.73	30	30.2	9	27.58	67	10.5	3	12.14	41	60.6	9
19.7	29.94	31	50.6	12	60.03	31	31.1	12	28.25	66	10.8	10	12.55	41	59.7	8
29.7	30.25	30	51.8	15	60.34	31	32.3	14	28.91	63	11.8	15	12.96	40	58.9	5
ay 9.7	30.55	30	53.3	17	60.65	29	33.7	15	29.54	58	13.3	21	13.36	40	58.4	4
19.7	30.85	28	55.0	19	60.94	28	35.2	17	30.12	52	15.4	25	13.76	38	58.0	1
29.6	31.13	25	56.9	20	61.22	27	36.9	17	30.64	44	17.9	30	14.14	35	57.9	1
ne 8.6	31.38	23	58.9	21	61.49	23	38.6	18	31.08	34	20.9	32	14.49	32	58.0	4
18.6	31.61	20	61.0	21	61.72	20	40.4	17	31.42	24	24.1	34	14.81	27	58.4	5
28.6	31.81	16	63.1	20	61.92	17	42.1	16	31.66	14	27.5	36	15.08	23	58.9	8
ly 8.5	31.97	12	65.1	19	62.09	12	43.7	15	31.80	2	31.1	36	15.31	17	59.7	10
18.5	32.09	7	67.0	18	62.21	8	45.2	13	31.82	9	34.7	35	15.48	12	60.7	11
28.5	32.16	3	68.8	16	62.29	4	46.5	12	31.73	19	38.2	34	15.60	6	61.8	12
ug. 7.4	32.19	2	70.4	14	62.33	1	47.7	10	31.54	30	41.6	32	15.66	1	63.0	13
17.4	32.17	5	71.8	12	62.32	5	48.7	8	31.24	39	44.8	29	15.65	5	64.3	13
27.4	32.12	9	73.0	9	62.27	8	49.5	6	30.85	48	47.7	26	15.60	11	65.6	12
ept. 6.4	32.03	12	73.9	7	62.19	12	50.1	5	30.37	55	50.3	22	15.49	15	66.8	11
16.3	31.91	15	74.6	5	62.07	14	50.6	2	29.82	60	52.5	17	15.34	19	67.9	9
26.3	31.76	16	75.1	2	61.93	15	50.8	0	29.22	64	54.2	12	15.15	21	68.8	7
ct. 6.3	31.60	16	75.3	0	61.78	16	50.8	1	28.58	67	55.4	8	14.94	21	69.5	4
16.3	31.44	16	75.3	3	61.62	15	50.7	3	27.91	67	56.2	2	14.73	21	69.9	2
26.2	31.28	14	75.0	5	61.47	14	50.4	5	27.24	66	56.4	4	14.52	19	70.1	1
ov. 5.2	31.14	13	74.5	8	61.33	12	49.9	6	26.58	62	56.0	10	14.33	17	70.0	4
15.2	31.01	10	73.7	10	61.21	9	49.3	8	25.96	57	55.0	15	14.16	13	69.6	6
25.1	30.91	6	72.7	12	61.12	6	48.5	9	25.39	51	53.5	20	14.03	8	69.0	9
ec. 5.1	30.85	3	71.5	13	61.06	2	47.6	11	24.88	42	51.5	25	13.95	3	68.1	11
15.1	30.82	1	70.2	15	61.04	1	46.5	11	24.46	32	49.0	28	13.92	2	67.0	12
25.1	30.83	5	68.7	16	61.05	6	45.4	12	24.14	21	46.2	32	13.94	8	65.8	14
35.0	30.88		67.1		61.11		44.2		23.93		43.0		14.02		64.4	
δ, Tan δ	1.012		+0.151		1.000		+0.014		2.930		+2.753		1.348		−0.903	
an Place	$29^{s}.388$		$66''.74$		$59^{s}.436$		$44''.84$		$28^{s}.687$		$37''.58$		$11^{s}.495$		$60''.95$	
, a, $D_{\omega} a$	0.00		0.00		0.00		0.00		−0.07		−0.08		+0.02		+0.03	
δ, $D_{\omega} \delta$	+0.2		−0.9		+0.2		−0.9		+0.2		−0.9		+0.2		−0.9	

Mean Solar Date.	ε Pavonis. Mag. 4.1				β Aquilæ. Mag. 3.9				γ Sagittæ. Mag. 3.7				c Sagittarii. Mag. 4.6			
	Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination S.	
	h m 19 50		° ′ −73 8		h m 19 50		° ′ + 6 10		h m 19 54		° ′ +19 14		h m 19 57		° ′ −27 57	
	s		″		s		″		s		″		s		″	
Jan. 1.1	21.09		52.3		57.69		62.0		48.77		62.0		13.10		31.4	
11.0	21.22	13	49.3	30	57.76	7	60.5	15	48.82	5	59.8	22	13.18	8	30.9	5
21.0	21.49	27	46.3	30	57.86	10	59.0	15	48.91	9	57.7	21	13.31	13	30.3	6
31.0	21.89	40	43.3	30	58.00	14	57.6	14	49.03	12	55.6	21	13.48	17	29.6	7
Feb. 9.9	22.40	51	40.4	29	58.17	17	56.3	13	49.19	16	53.6	20	13.68	20	28.8	8
19.9	23.02	62	37.7	27	58.37	20	55.2	11	49.38	19	52.0	16	13.91	23	28.0	8
29.9	23.73	71	35.2	25	58.59	22	54.4	8	49.60	22	50.6	14	14.17	26	27.2	8
Mar. 10.9	24.51	78	33.0	22	58.84	25	53.9	5	49.84	24	49.6	10	14.45	28	26.3	9
20.8	25.36	85	31.1	19	59.10	26	53.7	2	50.11	27	49.0	6	14.75	30	25.3	10
30.8	26.26	90	29.6	15	59.38	28	53.9	2	50.40	29	48.9	1	15.07	32	24.2	11
Apr. 9.8	27.19	93	28.5	11	59.68	30	54.4	5	50.70	30	49.2	3	15.41	34	23.2	10
19.7	28.14	95	27.7	8	59.98	30	55.2	8	51.00	30	50.0	8	15.76	35	22.2	10
29.7	29.08	94	27.4	3	60.29	31	56.4	12	51.31	31	51.2	12	16.11	35	21.2	10
May 9.7	30.01	93	27.5	1	60.59	30	57.9	15	51.62	31	52.8	16	16.46	35	20.3	9
19.7	30.90	89	28.0	5	60.88	29	59.6	17	51.92	30	54.7	19	16.80	34	19.4	9
29.6	31.74	84	28.9	9	61.16	28	61.4	18	52.20	28	56.9	22	17.13	33	18.7	7
June 8.6	32.51	77	30.2	13	61.42	26	63.3	19	52.47	27	59.2	23	17.44	31	18.1	6
18.6	33.19	68	31.9	17	61.66	24	65.3	20	52.70	23	61.7	25	17.72	28	17.7	4
28.6	33.76	57	33.9	20	61.86	20	67.2	19	52.89	19	64.2	25	17.97	25	17.5	2
July 8.5	34.21	45	36.2	23	62.02	16	69.1	19	53.05	16	66.7	25	18.18	21	17.4	1
18.5	34.53	32	38.6	24	62.14	12	70.9	18	53.17	12	69.1	24	18.34	16	17.6	2
28.5	34.72	19	41.2	26	62.22	8	72.5	16	53.24	7	71.4	23	18.45	11	17.9	3
Aug. 7.4	34.76	4	43.8	26	62.26	4	74.0	15	53.26	2	73.6	22	18.51	6	18.3	4
17.4	34.66	10	46.3	25	62.25	1	75.3	13	53.24	2	75.5	19	18.52	1	18.9	6
27.4	34.42	24	48.7	24	62.20	5	76.3	10	53.18	6	77.2	17	18.48	4	19.5	6
Sept. 6.4	34.07	35	50.8	21	62.11	9	77.1	8	53.08	10	78.6	14	18.40	8	20.2	7
16.3	33.61	46	52.7	19	61.99	12	77.7	6	52.95	13	79.7	11	18.29	11	20.8	6
26.3	33.06	55	54.1	14	61.85	14	78.1	4	52.80	15	80.5	8	18.14	15	21.4	6
Oct. 6.3	32.46	60	55.0	9	61.70	15	78.2	1	52.63	17	80.9	4	17.98	16	21.9	5
16.3	31.82	64	55.5	5	61.54	16	78.2	0	52.45	18	81.1	2	17.81	17	22.4	5
26.2	31.19	63	55.4	1	61.38	16	77.9	3	52.27	18	80.9	2	17.64	17	22.7	3
Nov. 5.2	30.59	60	54.8	6	61.23	15	77.4	5	52.11	16	80.3	6	17.48	16	22.8	1
15.2	30.05	54	53.6	12	61.11	12	76.6	8	51.97	14	79.4	9	17.34	14	22.8	0
25.1	29.59	46	52.0	16	61.02	9	75.7	9	51.85	12	78.3	11	17.24	10	22.7	1
Dec. 5.1	29.24	35	49.9	21	60.95	7	74.6	11	51.76	9	76.8	15	17.17	7	22.5	2
15.1	29.01	23.	47.5	24	60.92	3	73.3	13	51.71	5	75.1	17	17.15	2	22.1	4
25.1	28.92	9	44.7	28	60.93	1	71.9	14	51.70	1	73.2	19	17.17	2	21.7	4
35.0	28.96	4	41.8	29	60.98	5	70.5	14	51.73	3	71.1	21	17.23	6	21.1	6
Sec δ, Tan δ	3.449		−3.301		1.006		+0.108		1.060		+0.350		1.132		−0.531	
Mean Place	25$^{\mathrm{s}}$.767		37″.63		59$^{\mathrm{s}}$.441		70″.77		50$^{\mathrm{s}}$.594		69″.13		14$^{\mathrm{s}}$.942		18″.84	
$D'_{\psi} a$, $D_{\omega} a$	+0.08		+0.10		0.00		0.00		−0.01		−0.01		+0.01		+0.02	
$D_{\psi} \delta$, $D_{\omega} \delta$	+0.2		−0.9		+0.2		−0.9		+0.2		−0.9		+0.2		−0.9	

ar	*τ* **Aquilæ.** Mag. 5.6				*θ* **Aquilæ.** Mag. 3.4				*o* **Cygni** *seq.* Mag. 4.0				*κ* **Cephei.** Mag. 4.4			
	Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination N.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	19 59		+ 7 1		20 6		− 1 4		20 10		+46 28		20 11		+77 26	
	s		″		s		″		s		″		s		″	
.1	48.75		36.5		44.19		68.8		49.31		23.4		45.67		48.3	
.0	48.81	6	35.0	15	44.25	6	69.8	10	49.28	3	20.4	30	45.28	39	45.1	32
.0	48.90	9	33.5	15	44.35	10	70.8	10	49.31	3	17.3	31	45.07	21	41.8	33
.0	49.03	13	32.1	14	44.48	13	71.8	10	49.40	9	14.2	31	45.06	1	38.4	34
.0	49.19	16	30.8	13	44.64	16	72.6	8	49.53	13	11.3	29	45.24	18	35.1	33
.9	49.38	19	29.7	11	44.82	18	73.3	7	49.72	19	8.5	28	45.60	36	32.0	31
.9	49.59	21	28.9	8	45.03	21	73.7	4	49.96	24	6.1	24	46.13	53	29.1	29
.9	49.83	24	28.4	5	45.27	24	73.8	1	50.23	27	4.2	19	46.82	69	26.7	24
.8	50.09	26	28.2	2	45.53	26	73.7	1	50.55	32	2.8	14	47.63	81	24.8	19
.8	50.37	28	28.4	2	45.81	28	73.3	4	50.89	34	1.9	9	48.54	91	23.4	14
.8	50.66	29	28.9	5	46.10	29	72.7	6	51.25	36	1.6	3	49.52	98	22.7	7
.8	50.96	30	29.8	9	46.40	30	71.7	10	51.63	38	2.0	4	50.52	100	22.7	0
.7	51.27	31	31.0	12	46.71	31	70.5	12	52.01	38	3.0	10	51.53	101	23.2	5
.7	51.57	30	32.4	14	47.02	31	69.1	14	52.39	38	4.5	15	52.50	97	24.4	12
.7	51.87	30	34.1	17	47.32	30	67.6	15	52.75	36	6.5	20	53.40	90	26.1	17
.7	52.16	29	36.0	19	47.61	29	65.9	17	53.09	34	8.9	24	54.21	81	28.4	23
.6	52.42	26	38.0	20	47.89	28	64.2	17	53.40	31	11.7	28	54.90	69	31.1	27
.6	52.66	24	40.0	20	48.14	25	62.5	17	53.67	27	14.8	31	55.45	55	34.1	30
.6	52.87	21	42.0	20	48.36	22	60.8	17	53.89	22	18.1	33	55.85	40	37.4	33
.5	53.04	17	44.0	20	48.54	18	59.2	16	54.06	17	21.4	33	56.09	24	40.8	34
.5	53.17	13	45.9	19	48.68	14	57.8	14	54.18	12	24.8	34	56.16	7	44.4	36
.5	53.26	9	47.6	17	48.78	10	56.5	13	54.23	5	28.1	33	56.06	10	48.0	36
.5	53.30	4	49.1	15	48.84	6	55.4	11	54.23	0	31.3	32	55.80	26	51.5	35
.4	53.30	0	50.5	14	48.85	1	54.4	10	54.16	7	34.3	30	55.37	43	54.9	34
.4	53.25	5	51.6	11	48.82	3	53.7	7	54.05	11	37.1	28	54.79	58	58.0	31
.4	53.17	8	52.5	9	48.75	7	53.1	6	53.89	16	39.5	24	54.08	71	60.9	29
.4	53.06	11	53.2	7	48.64	11	52.7	4	53.68	21	41.5	20	53.25	83	63.4	25
.3	52.92	14	53.7	5	48.51	13	52.5	2	53.44	24	43.2	17	52.32	93	65.5	21
.3	52.77	15	53.9	2	48.37	14	52.5	0	53.18	26	44.4	12	51.32	100	67.2	17
.3	52.61	16	53.9	0	48.22	15	52.6	1	52.90	28	45.1	7	50.26	106	68.4	12
.2	52.46	15	53.6	3	48.07	15	52.9	3	52.62	28	45.3	2	49.17	109	69.1	7
.2	52.31	15	53.1	5	47.93	14	53.3	4	52.35	27	45.0	3	48.09	108	69.2	1
.2	52.18	13	52.4	7	47.81	12	53.9	6	52.09	26	44.2	8	47.03	106	68.7	5
.2	52.08	10	51.5	9	47.71	10	54.6	7	51.86	23	43.0	12	46.03	100	67.7	10
.1	52.01	7	50.4	11	47.64	7	55.4	8	51.67	19	41.2	18	45.12	91	66.1	16
.1	51.97	4	49.2	12	47.60	4	56.3	9	51.52	15	39.0	22	44.33	79	64.0	21
.1	51.97	0	47.8	14	47.60	0	57.2	9	51.41	11	36.4	26	43.68	65	61.4	26
.1	52.01	4	46.3	15	47.64	4	58.2	10	51.35	6	33.6	28	43.18	50	58.5	29
1 δ	1.008		+0.124		1.000		−0.018		1.452		+1.053		4.601		+4.491	
ce	$50^{s}.482$		$45''.12$		$45^{s}.891$		$59''.21$		$51^{s}.681$		$26''.49$		$52^{s}.353$		$48''.54$	
α	0.00		0.00		0.00		0.00		−0.02		−0.04		−0.10		−0.16	
δ	+0.2		−0.9		+0.2		−0.9		+0.2		−0.8		+0.2		−0.8	

Mean Solar Date.	**24 Vulpeculæ.** Mag. 5.4				**α^2 Capricorni.** Mag. 3.8				**β Capricorni.** Mag. 3.2				**α Pavonis.** Mag. 2.1			
	Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination S.		Right Ascension.		Declination S.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	20 12		+24 23		20 13		−12 49		20 16		−15 3		20 18		−57 0	
	s		″		s		″		s		″		s		″	
Jan. 1.1	59.31		52.3		8.70		16.9		2.44		47.2		39.02		80.5	
11.0	59.33	2	50.0	23	8.77	7	17.2	3	2.50	6	47.4	2	39.08	6	78.3	22
21.0	59.40	7	47.6	24	8.87	10	17.5	3	2.60	10	47.5	1	39.21	13	75.9	24
31.0	59.50	10	45.3	23	9.00	13	17.7	2	2.73	13	47.6	1	39.41	20	73.5	24
Feb. 10.0	59.64	14	43.2	21	9.16	16	17.8	1	2.90	17	47.5	1	39.66	25	71.1	24
19.9	59.81	17	41.2	20	9.35	19	17.7	1	3.09	19	47.3	2	39.97	31	68.7	24
29.9	60.02	21	39.6	16	9.57	22	17.5	2	3.31	22	47.0	3	40.33	36	66.4	23
Mar. 10.9	60.26	24	38.4	12	9.81	24	17.1	4	3.55	24	46.5	5	40.74	41	64.3	21
20.8	60.52	26	37.6	8	10.08	27	16.6	5	3.82	27	45.9	6	41.19	45	62.3	20
30.8	60.80	28	37.3	3	10.36	28	15.8	8	4.10	28	45.1	8	41.67	48	60.5	18
Apr. 9.8	61.10	30	37.4	1	10.66	30	14.9	9	4.40	30	44.1	10	42.17	50	59.0	15
19.8	61.41	31	38.1	7	10.97	31	13.9	10	4.72	32	43.0	11	42.69	52	57.7	13
29.7	61.73	32	39.2	11	11.29	32	12.7	12	5.04	32	41.8	12	43.22	53	56.7	10
May 9.7	62.05	32	40.8	16	11.61	32	11.4	13	5.37	33	40.5	13	43.76	54	56.1	6
19.7	62.36	31	42.7	19	11.93	32	10.1	13	5.69	32	39.2	13	44.28	52	55.8	3
29.7	62.66	30	44.9	22	12.24	31	8.7	14	6.00	31	37.9	13	44.79	51	55.9	1
June 8.6	62.93	27	47.4	25	12.53	29	7.4	13	6.29	29	36.7	12	45.27	48	56.3	4
18.6	63.18	25	50.0	26	12.79	26	6.2	12	6.57	28	35.6	11	45.70	43	57.1	8
28.6	63.39	21	52.7	27	13.03	24	5.1	11	6.81	24	34.6	10	46.09	39	58.1	10
July 8.5	63.56	17	55.4	27	13.23	20	4.1	10	7.01	20	33.7	9	46.42	33	59.5	14
18.5	63.69	13	58.1	27	13.39	16	3.3	8	7.17	16	33.0	7	46.67	25	61.1	16
28.5	63.78	9	60.7	26	13.50	11	2.7	6	7.29	12	32.5	5	46.85	18	62.9	18
Aug. 7.5	63.82	4	63.2	25	13.57	7	2.2	5	7.37	8	32.1	4	46.96	11	64.9	20
17.4	63.81	1	65.4	22	13.59	2	1.9	3	7.39	2	32.0	1	46.98	2	66.9	20
27.4	63.75	6	67.4	20	13.57	2	1.8	1	7.37	2	31.9	1	46.93	5	68.9	20
Sept. 6.4	63.66	9	69.1	17	13.51	6	1.8	0	7.31	6	32.0	1	46.80	13	70.8	19
16.4	63.53	13	70.5	14	13.41	10	1.9	1	7.22	9	32.2	2	46.62	18	72.5	17
26.3	63.37	16	71.5	10	13.28	13	2.0	1	7.10	12	32.5	3	46.38	24	73.9	14
Oct. 6.3	63.20	17	72.2	7	13.14	14	2.3	3	6.95	15	32.8	3	46.10	28	75.1	12
16.3	63.02	18	72.6	4	12.99	15	2.6	3	6.80	15	33.1	3	45.80	30	75.9	8
26.2	62.84	18	72.6	0	12.84	15	2.9	3	6.65	15	33.5	4	45.49	31	76.3	4
Nov. 5.2	62.66	18	72.2	4	12.70	14	3.3	4	6.50	15	33.9	4	45.19	30	76.2	1
15.2	62.50	16	71.4	8	12.58	12	3.7	4	6.38	12	34.2	3	44.92	27	75.8	4
25.2	62.36	14	70.3	11	12.48	10	4.1	4	6.28	10	34.5	3	44.69	23	74.9	9
Dec. 5.1	62.25	11	68.8	15	12.41	7	4.4	3	6.20	8	34.8	3	44.52	17	73.6	13
15.1	62.18	7	67.0	18	12.38	3	4.8	4	6.17	3	35.1	3	44.40	12	72.0	16
25.1	62.14	4	65.0	20	12.38	0	5.2	4	6.17	0	35.4	3	44.35	5	70.1	19
35.1	62.14	0	62.8	22	12.42	4	5.5	3	6.21	4	35.6	2	44.37	2	67.9	22
Sec δ, Tan δ	1.098		+0.454		1.026		−0.228		1.035		−0.269		1.837		−1.541	
Mean Place	$61^{s}.172$		$58''.06$		$10^{s}.393$		$5''.65$		$4^{s}.133$		$35''.65$		$41^{s}.515$		$64''.50$	
$D'_\psi \alpha$, $D_\omega \alpha$	−0.01		−0.02		+0.01		+0.01		+0.01		+0.01		+0.03		+0.06	
$D_\psi \delta$, $D_\omega \delta$	+0.2		−0.8		+0.2		−0.8		+0.2		−0.8		+0.2		−0.8	

FOR THE UPPER TRANSIT AT WASHINGTON.

an Solar Date.	γ Cygni. Mag. 2.3				π Capricorni. Mag. 5.2				ρ Capricorni. Mag. 5.0				41 Cygni. Mag. 4.1			
	Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination S.		Right Ascension.		Declination N.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	20 19		+39 58		20 22		−18 29		20 23		−18 6		20 25		+30 4	
	s		″		s		″		s		″		s		″	
n. 1.1	2.03		24.9		15.45		74.7		48.89		30.9		46.11		23.5	
		1		27		6		0		6		0		1		24
11.0	2.02		22.2		15.51		74.7		48.95		30.9		46.12		21.1	
		3		29		9		1		9		1		4		25
21.0	2.05		19.3		15.60		74.6		49.04		30.8		46.16		18.6	
		8		29		13		2		12		2		8		25
31.0	2.13		16.4		15.73		74.4		49.16		30.6		46.24		16.1	
		13		28		16		3		16		2		12		24
b. 10.0	2.26		13.6		15.89		74.1		49.32		30.4		46.36		13.7	
		17		25		19		4		19		4		16		22
19.9	2.43		11.1		16.08		73.7		49.51		30.0		46.52		11.5	
		21		23		22		5		21		5		20		19
29.9	2.64		8.8		16.30		73.2		49.72		29.5		46.72		9.6	
		25		18		24		7		24		7		23		15
ar. 10.9	2.89		7.0		16.54		72.5		49.96		28.8		46.95		8.1	
		29		13		26		8		27		8		26		10
20.9	3.18		5.7		16.80		71.7		50.23		28.0		47.21		7.1	
		31		7		29		9		29		10		28		6
30.8	3.49		5.0		17.09		70.8		50.52		27.0		47.49		6.5	
		33		2		31		11		30		10		31		0
r. 9.8	3.82		4.8		17.40		69.7		50.82		26.0		47.80		6.5	
		35		4		31		12		32		12		32		5
19.8	4.17		5.2		17.71		68.5		51.14		24.8		48.12		7.0	
		36		9		33		12		33		12		33		10
29.7	4.53		6.1		18.04		67.3		51.47		23.6		48.45		8.0	
		35		15		33		13		33		13		33		15
y 9.7	4.88		7.6		18.37		66.0		51.80		22.3		48.78		9.5	
		35		20		33		12		32		13		32		19
19.7	5.23		9.6		18.70		64.8		52.12		21.0		49.10		11.4	
		32		23		32		12		32		12		31		23
29.7	5.55		11.9		19.02		63.6		52.44		19.8		49.41		13.7	
		30		27		31		12		31		12		29		25
ne 8.6	5.85		14.6		19.33		62.4		52.75		18.6		49.70		16.2	
		27		29		28		10		28		10		26		27
18.6	6.12		17.5		19.61		61.4		53.03		17.6		49.96		18.9	
		22		31		25		8		25		9		23		29
28.6	6.34		20.6		19.86		60.6		53.28		16.7		50.19		21.8	
		18		33		21		7		21		7		19		30
ly 8.6	6.52		23.9		20.07		59.9		53.49		16.0		50.38		24.8	
		13		32		17		6		18		6		14		29
18.5	6.65		27.1		20.24		59.3		53.67		15.4		50.52		27.7	
		7		32		13		3		13		3		9		29
28.5	6.72		30.3		20.37		59.0		53.80		15.1		50.61		30.6	
		2		30		8		1		8		2		4		27
ug. 7.5	6.74		33.3		20.45		58.9		53.88		14.9		50.65		33.3	
		3		29		3		0		3		0		0		25
17.4	6.71		36.2		20.48		58.9		53.91		14.9		50.65		35.8	
		8		26		1		1		1		1		5		23
27.4	6.63		38.8		20.47		59.0		53.90		15.0		50.60		38.1	
		13		23		5		3		5		2		10		20
pt. 6.4	6.50		41.1		20.42		59.3		53.85		15.2		50.50		40.1	
		16		19		10		3		9		4		13		17
16.4	6.34		43.0		20.32		59.6		53.76		15.6		50.37		41.8	
		20		16		12		4		12		4		16		13
26.3	6.14		44.6		20.20		60.0		53.64		16.0		50.21		43.1	
		22		11		14		4		14		4		18		10
t. 6.3	5.92		45.7		20.06		60.4		53.50		16.4		50.03		44.1	
		24		7		15		5		16		4		19		5
16.3	5.68		46.4		19.91		60.9		53.34		16.8		49.84		44.6	
		24		3		15		4		15		4		20		2
26.3	5.44		46.7		19.76		61.3		53.19		17.2		49.64		44.8	
		23		3		15		3		15		4		19		3
ov. 5.2	5.21		46.4		19.61		61.6		53.04		17.6		49.45		44.5	
		22		7		13		3		13		3		18		7
15.2	4.99		45.7		19.48		61.9		52.91		17.9		49.27		43.8	
		20		12		11		3		11		2		16		10
25.2	4.79		44.5		19.37		62.2		52.80		18.1		49.11		42.8	
		16		16		7		2		7		2		13		15
ec. 5.1	4.63		42.9		19.30		62.4		52.73		18.3		48.98		41.3	
		13		20		4		1		4		2		9		18
15.1	4.50		40.9		19.26		62.5		52.69		18.5		48.89		39.5	
		8		24		1		0		1		1		6		21
25.1	4.42		38.5		19.25		62.5		52.68		18.6		48.83		37.4	
		4		26		4		0		3		0		3		23
35.1	4.38		35.9		19.29		62.5		52.71		18.6		48.80		35.1	
δ, Tan δ	1.305		+0.838		1.054		−0.335		1.052		−0.327		1.156		+0.579	
n Place	4ˢ.185		28″.28		17ˢ.132		62″.63		50ˢ.567		18″.82		48ˢ.040		27″.91	
α, D_ω α	−0.02		−0.03		+0.01		+0.01		+0.01		+0.01		−0.01		−0.02	
; D_ω δ	+0.2		−0.8		+0.2		−0.8		+0.2		−0.8		+0.2		−0.8	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	θ Cephei. Mag. 4.3				ε Delphini. Mag. 4.0				Groombridge 3241. Mag. 6.4				α Indi. Mag. 3.2			
	Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination S.	
	h m 20 28		° ′ +62 41		h m 20 28		° ′ +10 59		h m 20 30		° ′ +72 13		h m 20 31		° ′ −47 35	
	s		″		s		″		s		″		s		″	
Jan. 1.1	3.09		53.0		58.85		65.4		18.86		61.9		20.77		73.0	
11.0	2.95	14	49.9	31	58.88	3	63.8	16	18.57	29	58.9	30	20.82	5	71.3	17
21.0	2.89	6	46.6	33	58.94	6	62.2	16	18.40	17	55.6	33	20.92	10	69.4	19
31.0	2.91	2	43.3	33	59.04	10	60.6	16	18.37	3	52.2	34	21.07	15	67.5	19
Feb. 10.0	3.02	11	40.0	33	59.17	13	59.2	14	18.47	10	48.9	33	21.27	20	65.4	21
19.9	3.21	19	36.8	32	59.33	16	57.9	13	18.70	23	45.7	32	21.51	24	63.4	20
29.9	3.48	27	34.0	28	59.52	19	56.9	10	19.06	36	42.8	29	21.80	29	61.4	20
Mar. 10.9	3.83	35	31.6	24	59.73	21	56.2	7	19.53	47	40.2	26	22.12	32	59.4	20
20.9	4.23	40	29.7	19	59.97	24	55.9	3	20.09	56	38.2	20	22.48	36	57.5	19
30.8	4.69	46	28.4	13	60.24	27	55.9	0	20.73	64	36.7	15	22.86	38	55.7	18
Apr. 9.8	5.18	49	27.7	7	60.52	28	56.4	5	21.43	70	35.8	9	23.27	41	54.1	16
19.8	5.70	52	27.6	1	60.82	30	57.2	8	22.16	73	35.6	2	23.70	43	52.7	14
29.7	6.23	53	28.2	6	61.13	31	58.3	11	22.91	75	36.0	4	24.14	44	51.5	12
May 9.7	6.75	52	29.4	12	61.44	31	59.8	15	23.64	73	37.0	10	24.58	44	50.5	10
19.7	7.25	50	31.1	17	61.74	30	61.6	18	24.34	70	38.6	16	25.02	44	49.8	7
29.7	7.72	47	33.4	23	62.04	30	63.6	20	24.98	64	40.7	21	25.45	43	49.4	4
June 8.6	8.13	41	36.1	27	62.32	28	65.7	21	25.55	57	43.3	26	25.86	41	49.3	1
18.6	8.49	36	39.1	30	62.58	26	67.9	22	26.03	48	46.3	30	26.24	38	49.6	3
28.6	8.78	29	42.5	34	62.81	23	70.1	22	26.40	37	49.6	33	26.58	34	50.1	5
July 8.6	9.00	22	46.0	35	63.00	19	72.3	22	26.67	27	53.1	35	26.88	30	50.9	8
18.5	9.14	14	49.6	36	63.16	16	74.5	22	26.81	14	56.7	36	27.11	23	52.0	11
28.5	9.19	5	53.2	36	63.27	11	76.5	20	26.83	2	60.3	36	27.29	18	53.3	13
Aug. 7.5	9.15	4	56.8	36	63.34	7	78.3	18	26.73	10	63.9	36	27.40	11	54.8	15
17.4	9.04	11	60.2	34	63.36	2	80.0	17	26.52	21	67.4	35	27.45	5	56.4	16
27.4	8.85	19	63.4	32	63.33	3	81.4	14	26.19	33	70.7	33	27.43	2	58.0	16
Sept. 6.4	8.58	27	66.3	29	63.27	6	82.6	12	25.76	43	73.8	31	27.36	7	59.6	16
16.4	8.26	32	68.9	26	63.18	9	83.5	9	25.23	53	76.5	27	27.23	13	61.1	15
26.3	7.88	38	71.1	22	63.06	12	84.2	7	24.63	60	78.8	23	27.05	18	62.5	14
Oct. 6.3	7.46	42	72.8	17	62.91	15	84.6	4	23.97	66	80.7	19	26.84	21	63.6	11
16.3	7.02	44	74.0	12	62.76	15	84.8	2	23.26	71	82.1	14	26.62	22	64.4	8
26.3	6.56	46	74.7	7	62.60	16	84.7	1	22.53	73	83.0	9	26.38	24	64.9	5
Nov. 5.2	6.10	46	74.8	1	62.45	15	84.3	4	21.79	74	83.3	3	26.15	23	65.1	2
15.2	5.65	45	74.4	4	62.31	14	83.7	6	21.07	72	83.0	3	25.94	21	65.0	1
25.2	5.23	42	73.4	10	62.19	12	82.9	8	20.38	69	82.2	8	25.76	18	64.5	5
Dec. 5.1	4.86	37	71.9	15	62.10	9	81.8	11	19.75	63	80.8	14	25.63	13	63.6	9
15.1	4.53	33	69.9	20	62.04	6	80.5	13	19.19	56	78.9	19	25.54	9	62.5	11
25.1	4.27	26	67.4	25	62.02	2	79.1	14	18.72	47	76.5	24	25.50	4	61.1	14
35.1	4.08	19	64 5	29	62.03	1	77.6	15	18.36	36	73.7	28	25.51	1	59.4	17
Sec δ, Tan δ	2.180		+1.938		1.019		+0.194		3.277		+3.121		1.483		−1.095	
Mean Place	6ˢ.457		52″.96		60ˢ.545		72″.82		23ˢ.715		60″.94		22ˢ.810		57″.06	
$D'_\psi \alpha$, $D_\omega \alpha$	−0.04		−0.08		0.00		−0.01		−0.07		−0.13		+0.02		+0.04	
$D_\psi \delta$, $D_\omega \delta$	+0.2		−0.8		+0.2		−0.8		+0.2		−0.8		+0.2		−0.8	

[Eph 12]

Mean Solar Date.	β Delphini. Mag. 3.7				υ Capricorni. Mag. 5.3				α Delphini. Mag. 3.9				β Pavonis. Mag. 3.6			
	Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination S.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	20 33		+14 17		20 35		−18 26		20 35		+15 35		20 36		−66 31	
	s		″		s		″		s		″		s		″	
Jan. 1.1	23.67		11.7		0.88		68.5		31.34		58.2		59.47		31.0	
11.1	23.69	2	10.0	17	0.92	4	68.5	0	31.36	2	56.4	18	59.47	0	28.4	26
21.0	23.75	6	8.2	18	1.00	8	68.4	1	31.41	5	54.5	19	59.57	10	25.6	28
31.0	23.84	9	6.4	18	1.11	11	68.1	3	31.49	8	52.7	18	59.76	19	22.7	29
Feb. 10.0	23.96	12	4.8	16	1.26	15	67.8	3	31.61	12	51.1	16	60.03	27	19.7	30
19.9	24.12	16	3.4	14	1.44	18	67.4	4	31.77	16	49.6	15	60.39	36	16.8	29
29.9	24.30	18	2.2	12	1.64	20	66.8	6	31.95	18	48.4	12	60.82	43	14.0	28
Mar. 10.9	24.52	22	1.4	8	1.87	23	66.0	8	32.16	21	47.4	10	61.32	50	11.4	26
20.9	24.76	24	0.9	5	2.13	26	65.1	9	32.40	24	46.9	5	61.87	55	9.0	24
30.8	25.02	26	0.8	1	2.41	28	64.1	10	32.66	26	46.8	1	62.47	60	6.9	21
Apr. 9.8	25.30	28	1.2	4	2.71	30	63.0	11	32.94	28	47.1	3	63.12	65	5.0	19
19.8	25.60	30	1.9	7	3.03	32	61.7	13	33.24	30	47.8	7	63 79	67	3.5	15
29.8	25.91	31	3.0	11	3.35	32	60.4	13	33.55	31	48.9	11	64.48	69	2.4	11
May 9.7	26.22	31	4.5	15	3.68	33	59.1	13	33.87	32	50.4	15	65.18	70	1.7	7
19.7	26.53	31	6.3	18	4.02	34	57.7	14	34.18	31	52.2	18	65.88	70	1.4	3
29.7	26.83	30	8.3	20	4.34	32	56.4	13	34.48	30	54.2	20	66.55	67	1.5	1
June 8.6	27.12	29	10.5	22	4.65	31	55.2	12	34.76	28	56.4	22	67.18	63	2.0	5
18.6	27.38	26	12.8	23	4.94	29	54.2	10	35.02	26	58.8	24	67.77	59	2.9	9
28.6	27.61	23	15.2	24	5.20	26	53.2	10	35.26	24	61.2	24	68.29	52	4.2	13
July 8.6	27.81	20	17.6	24	5.42	22	52.4	8	35.46	20	63.6	24	68.74	45	5.8	16
18.5	27.96	15	19.9	23	5.61	19	51.9	5	35.62	16	66.0	24	69.09	35	7.8	20
28.5	28.07	11	22.1	22	5.75	14	51.5	4	35.73	11	68.3	23	69.35	26	9.9	21
Aug. 7.5	28.14	7	24.1	20	5.84	9	51.3	2	35.80	7	70.4	21	69.51	16	12.2	23
17.5	28.17	3	25.9	18	5.89	5	51.3	0	35.82	2	72.3	19	69.56	5	14.6	24
27.4	28.15	2	27.5	16	5.89	0	51.4	1	35.80	2	74.0	17	69.50	6	17.0	24
Sept. 6.4	28.08	7	28.9	14	5.84	5	51.7	3	35.74	6	75.4	14	69.34	16	19.3	23
16.4	27.99	9	30.0	11	5.76	8	52.1	4	35.64	10	76.5	11	69.10	24	21.4	21
26.3	27.87	12	30.8	8	5.65	11	52.5	4	35.52	12	77.4	9	68.78	32	23.2	18
Oct. 6.3	27.72	15	31.4	6	5.51	14	52.9	4	35.37	15	78.0	6	68.39	39	24.6	14
16.3	27.56	16	31.6	2	5.36	15	53.4	5	35.22	15	78.3	3	67.97	42	25.6	10
26.3	27.40	16	31.6	0	5.21	15	53.9	5	35.06	16	78.3	0	67.53	44	26.2	6
Nov. 5.2	27.25	15	31.3	3	5.06	15	54.3	4	34.90	16	78.0	3	67.09	44	26.2	0
15.2	27.11	14	30.7	6	4.93	13	54.6	3	34.76	14	77.4	6	66.68	41	25.8	4
25.2	26.98	13	29.8	9	4.82	11	54.9	3	34.63	13	76.5	9	66.32	36	24.8	10
Dec. 5.2	26.89	9	28.6	12	4.73	9	55.1	2	34.53	10	75.4	11	66.01	31	23.4	14
15.1	26.82	7	27.3	13	4.68	5	55.2	1	34.46	7	74.1	13	65.78	23	21.5	19
25.1	26.78	4	25.8	15	4.67	1	55.3	1	34.42	4	72.5	16	65.63	15	19.2	23
35.1	26.78	0	24.1	17	4.69	2	55.3	0	34.42	0	70.8	17	65.58	5	16.7	25
Sec δ, Tan δ	1.032		+0.255		1.054		−0.334		1.039		+0.279		2.510		−2.302	
Mean Place	$25^{s}.384$		18″.38		$2^{s}.514$		56″.22		$33^{s}.054$		64″.56		$62^{s}.462$		13″.39	
$D'_{\psi}\alpha$, $D_{\omega}\alpha$	−0.01		−0.01		+0.01		+0.01		−0.01		−0.01		+0.05		+0.10	
$D_{\psi}\delta$, $D_{\omega}\delta$	+0.2		−0.8		+0.2		−0.8		+0.2		−0.8		+0.3		−0.8	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	α Cygni. Mag. 1.3				δ Delphini. Mag. 4.5				ψ Capricorni. Mag. 4.3				γ Delphini seq. Mag. 4.5			
	Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination N.	
	h m 20 38		° ′ +44 57		h m 20 39		° ′ +14 45		h m 20 40		° ′ −25 35		h m 20 42		° ′ +15 4	
	s		″		s		″		s		″		s		″	
Jan. 1.1	23.62		54.0		19.34		23.2		51.62		28.7		32.83		17.7	
11.1	23.57	5	51.3	27	19.35	1	21.4	18	51.66	4	28.3	4	32.84	1	15.9	
21.0	23.56	1	48.4	29	19.40	5	19.6	18	51.74	8	27.7	6	32.88	4	14.1	
31.0	23.61	5	45.4	30	19.48	8	17.9	17	51.85	11	27.0	7	32.96	8	12.3	
Feb. 10.0	23.71	10	42.4	30	19.60	12	16.3	16	52.00	15	26.2	8	33.08	12	10.6	
19.9	23.86	15	39.7	27	19.75	15	14.8	15	52.18	18	25.3	9	33.22	14	9.1	
29.9	24.06	20	37.3	24	19.93	18	13.6	12	52.39	21	24.3	10	33.40	18	7.9	12
Mar. 10.9	24.30	24	35.2	21	20.14	21	12.8	8	52.63	24	23.2	11	33.60	20	7.0	
20.9	24.59	29	33.6	16	20.38	24	12.3	5	52.89	26	22.0	12	33.84	24	6.4	
30.8	24.91	32	32.6	10	20.64	26	12.2	1	53.18	29	20.7	13	34.10	26	6.3	
Apr. 9.8	25.25	34	32.2	4	20.92	28	12.5	3	53.49	31	19.4	13	34.38	28	6.5	
19.8	25.61	36	32.3	1	21.21	29	13.2	7	53.82	33	18.1	13	34.67	29	7.2	7
29.8	25.99	38	33.0	7	21.52	31	14.3	11	54.16	34	16.7	14	34.98	31	8.3	11
May 9.7	26.37	38	34.3	13	21.83	31	15.8	15	54.51	35	15.4	13	35.30	32	9.8	15
19.7	26.74	37	36.1	18	22.14	31	17.6	18	54.85	34	14.2	12	35.61	31	11.6	
29.7	27.09	35	38.4	23	22.45	31	19.6	20	55.19	34	13.0	12	35.91	30	13.6	
June 8.6	27.42	33	41.0	26	22.74	29	21.8	22	55.52	33	12.0	10	36.20	29	15.8	22
18.6	27.72	30	43.9	29	23.00	26	24.1	23	55.83	31	11.2	8	36.47	27	18.1	23
28.6	27.97	25	47.1	32	23.24	24	26.5	24	56.10	27	10.6	6	36.71	24	20.6	25
July 8.6	28.18	21	50.4	33	23.44	20	28.9	24	56.34	24	10.2	4	36.91	20	23.0	24
18.5	28.33	15	53.8	34	23.60	16	31.2	23	56.54	20	10.0	2	37.08	17	25.4	24
28.5	28.42	9	57.1	33	23.72	12	33.4	22	56.70	16	10.1	1	37.20	12	27.7	23
Aug. 7.5	28.46	4	60.4	33	23.79	7	35.5	21	56.80	10	10.3	2	37.27	7	29.8	21
17.5	28.44	2	63.5	31	23.82	3	37.4	19	56.85	5	10.7	4	37.30	3	31.7	19
27.4	28.36	8	66.4	29	23.80	2	39.1	17	56.86	1	11.2	5	37.29	1	33.4	17
Sept. 6.4	28.24	12	69.0	26	23.75	5	40.5	14	56.82	4	11.9	7	37.23	6	34.9	15
16.4	28.07	17	71.2	22	23.66	9	41.6	11	56.74	8	12.6	7	37.14	9	36.1	12
26.3	27.86	21	73.1	19	23.53	13	42.5	9	56.62	12	13.3	7	37.02	12	37.0	9
Oct. 6.3	27.63	23	74.6	15	23.39	14	43.1	6	56.48	14	13.9	6	36.88	14	37.7	7
16.3	27.38	25	75.6	10	23.24	15	43.4	3	56.33	15	14.5	6	36.73	15	38.0	3
26.3	27.12	26	76.1	5	23.08	16	43.4	0	56.17	16	15.1	6	36.57	16	38.0	0
Nov. 5.2	26.86	26	76.2	1	22.92	16	43.1	3	56.01	16	15.5	4	36.41	16	37.8	2
15.2	26.62	24	75.7	5	22.78	14	42.5	6	55.87	14	15.8	3	36.26	15	37.2	6
25.2	26.39	23	74.7	10	22.65	13	41.6	9	55.75	12	15.9	1	36.13	13	36.4	8
Dec. 5.2	26.19	20	73.3	14	22.55	10	40.5	11	55.65	10	15.9	0	36.03	10	35.3	11
15.1	26.02	17	71.4	19	22.48	7	39.2	13	55.59	6	15.7	2	35.96	7	33.9	14
25.1	25.90	12	69.1	23	22.44	4	37.7	15	55.57	2	15.4	3	35.91	5	32.3	16
35.1	25.82	8	66.5	26	22.43	1	36.0	17	55.59	2	15.0	4	35.90	1	30.6	17
Sec δ, Tan δ	1.413		+0.999		1.034		+0.264		1.109		−0.479		1.039		+0.283	
Mean Place	25ˢ.895		55″.48		21ˢ.040		29″.59		53ˢ.268		15″.22		34ˢ.532		23″.84	
D′ψ α, Dω α	−0.02		−0.04		−0.01		−0.01		+0.01		+0.02		−0.01		−0.01	
Dψ δ, Dω δ	+0.3		−0.8		+0.3		−0.8		+0.3		−0.8		+0.3		−0.8	

[illegible]

FOR THE UPPER TRANSIT AT WASHINGTON.

an Solar Date.	**ε Cygni.** Mag. 2.6				**ε Aquarii.** Mag. 3.8				**η Cephei.** Mag. 3.6				**μ Aquarii.** Mag. 4.8			
	Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination S.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	20 42		+33 38		20 42		− 9 48		20 43		+61 29		20 47		− 9 18	
	s		″		s		″		s		″		s		″	
1. 1.1	37.07	2	21.6	25	53.22	3	77.3	5	26.88	15	49.4	30	52.95	3	61.8	5
11.1	37.05	2	19.1	25	53.25	7	77.8	4	26.73	8	46.4	31	52.98	6	62.3	4
21.0	37.07	6	16.6	26	53.32	10	78.2	3	26.65	1	43.3	32	53.04	9	62.7	3
31.0	37.13	10	14.0	25	53.42	13	78.5	2	26.64	8	40.1	33	53.13	13	63.0	2
b. 10.0	37.23	15	11.5	23	53.55	16	78.7	0	26.72	16	36.8	31	53.26	15	63.2	1
19.9	37.38	18	9.2	21	53.71	19	78.7	1	26.88	24	33.7	29	53.41	18	63.3	1
29.9	37.56	22	7.1	17	53.90	21	78.6	4	27.12	30	30.8	24	53.59	21	63.2	4
ar. 10.9	37.78	25	5.4	12	54.11	24	78.2	5	27.42	37	28.4	20	53.80	24	62.8	5
20.9	38.03	28	4.2	7	54.35	27	77.7	8	27.79	43	26.4	14	54.04	26	62.3	8
30.8	38.31	31	3.5	2	54.62	28	76.9	10	28.22	47	25.0	8	54.30	28	61.5	10
or. 9.8	38.62	32	3.3	3	54.90	30	75.9	12	28.69	50	24.2	2	54.58	30	60.5	12
19.8	38.94	34	3.6	9	55.20	31	74.7	13	29.19	51	24.0	4	54.88	31	59.3	13
29.8	39.28	34	4.5	14	55.51	32	73.4	14	29.70	51	24.4	10	55.19	32	58.0	14
ay 9.7	39.62	34	5.9	18	55.83	32	72.0	15	30.21	50	25.4	17	55.51	32	56.6	16
19.7	39.96	32	7.7	22	56.15	32	70.5	16	30.71	46	27.1	21	55.83	31	55.0	16
29.7	40.28	31	9.9	25	56.47	30	68.9	15	31.17	43	29.2	26	56.14	30	53.4	16
ne 8.6	40.59	28	12.4	28	56.77	28	67.4	15	31.60	38	31.8	30	56.44	29	51.8	15
18.6	40.87	25	15.2	30	57.05	25	65.9	14	31.98	31	34.8	33	56.73	26	50.3	14
28.6	41.12	20	18.2	30	57.30	22	64.5	12	32.29	24	38.1	35	56.99	22	48.9	13
ly 8.6	41.32	16	21.2	31	57.52	18	63.3	11	32.53	17	41.6	36	57.21	19	47.6	11
18.5	41.48	11	24.3	30	57.70	14	62.2	9	32.70	8	45.2	37	57.40	14	46.5	9
28.5	41.59	6	27.3	29	57.84	10	61.3	7	32.78	1	48.9	36	57.54	10	45.6	8
ug. 7.5	41.65	1	30.2	28	57.94	5	60.6	6	32.79	7	52.5	35	57.64	5	44.8	5
17.5	41.66	4	33.0	25	57.99	0	60.0	3	32.72	15	56.0	33	57.69	1	44.3	4
27.4	41.62	9	35.5	22	57.99	4	59.7	2	32.57	22	59.3	31	57.70	4	43.9	2
pt. 6.4	41.53	12	37.7	19	57.95	8	59.5	0	32.35	29	62.4	27	57.66	7	43.7	1
16.4	41.41	15	39.6	16	57.87	10	59.5	1	32.06	33	65.1	24	57.59	10	43.6	1
26.3	41.26	18	41.2	12	57.77	12	59.6	2	31.73	38	67.5	19	57.49	12	43.7	2
ct. 6.3	41.08	20	42.4	8	57.65	14	59.8	3	31.35	41	69.4	14	57.37	14	43.9	3
16.3	40.88	20	43.2	4	57.51	15	60.1	4	30.94	43	70.8	10	57.23	14	44.2	3
26.3	40.68	20	43.6	0	57.36	14	60.5	4	30.51	43	71.8	3	57.09	14	44.5	4
ov. 5.2	40.48	19	43.6	5	57.22	13	60.9	4	30.08	42	72.1	2	56.95	13	44.9	5
15.2	40.29	18	43.1	9	57.09	11	61.3	5	29.66	40	71.9	7	56.82	11	45.4	5
25.2	40.11	15	42.2	14	56.98	8	61.8	5	29.26	37	71.2	13	56.71	9	45.9	5
ec. 5.2	39.96	12	40.8	17	56.90	6	62.3	5	28.89	32	69.9	19	56.62	6	46.4	5
15.1	39.84	8	39.1	20	56.84	2	62.8	5	28.57	27	68.0	23	56.56	2	46.9	5
25.1	39.76	4	37.1	23	56.82	1	63.3	4	28.30	20	65.7	27	56.54	1	47.4	5
35.1	39.72		34.8		56.83		63.7		28.10		63.0		56.55		47.9	
δ, Tan δ	1.202		+0.665		1.015		−0.172		2.096		+1.842		1.013		−0.164	
n Place	39ˢ.032		24″.51		54ˢ.807		66″.46		30ˢ.103		48″.32		54ˢ.517		51″.06	
a, Dω a	−0.01		−0.03		0.00		+0.01		−0.04		−0.08		0.00		+0.01	
ı, Dω δ	+0.3		−0.8		+0.3		−0.8		+0.3		−0.8		+0.3		−0.7	

Mean Solar Date.	β Indi. Mag. 3.7				32 Vulpeculæ. Mag. 5.2				220 Draconis (*Heis*). Mag. 5.6				ν Cygni. Mag. 4.0			
	Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination N.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	20 47		−58 47		20 50		+27 43		20 51		+80 12		20 53		+40 49	
	s		″		s		″		s		″		s		″	
Jan. 1.1	54.09		29.8		46.72		17.3		28.55		85.7		51.40		39.2	
11.1	54.10	1	27.6	22	46.71	1	15.1	22	27.82	73	82.9	28	51.35	5	36.6	26
21.0	54.17	7	25.1	25	46.73	2	12.8	23	27.32	50	79.8	31	51.34	1	33.9	27
31.0	54.31	14	22.5	26	46.78	5	10.5	23	27.06	26	76.5	33	51.38	4	31.1	28
Feb. 10.0	54.52	21	19.8	27	46.88	10	8.2	23	27.04	2	73.2	33	51.46	8	28.3	28
20.0	54.79	27	17.2	26	47.02	14	6.1	21	27.27	23	70.0	32	51.59	13	25.7	26
29.9	55.11	32	14.6	26	47.19	17	4.3	18	27.73	46	66.9	31	51.76	17	23.4	23
Mar. 10.9	55.49	38	12.0	26	47.39	20	2.8	15	28.42	69	64.1	28	51.98	22	21.4	20
20.9	55.91	42	9.6	24	47.63	24	1.8	10	29.30	88	61.8	23	52.24	26	19.8	16
30.8	56.37	46	7.5	21	47.89	26	1.2	6	30.33	103	60.0	18	52.53	29	18.8	10
Apr. 9.8	56.87	50	5.6	19	48.18	29	1.1	1	31.49	116	58.8	12	52.85	32	18.3	5
19.8	57.40	53	3.9	17	48.49	31	1.5	4	32.72	123	58.2	6	53.19	34	18.4	1
29.8	57.95	55	2.6	13	48.81	32	2.4	9	33.99	127	58.2	0	53.55	36	19.1	7
May 9.7	58.50	55	1.6	10	49.14	33	3.8	14	35.25	126	58.9	7	53.91	36	20.3	12
19.7	59.06	56	0.9	7	49.47	33	5.6	18	36.46	121	60.1	12	54.27	36	22.0	17
29.7	59.60	54	0.6	3	49.79	32	7.7	21	37.59	113	61.9	18	54.62	35	24.2	22
June 8.7	60.12	52	0.8	2	50.09	30	10.1	24	38.59	100	64.2	23	54.95	33	26.7	25
18.6	60.60	48	1.3	5	50.37	28	12.8	27	39.44	85	66.9	27	55.25	30	29.5	28
28.6	61.04	44	2.2	9	50.62	25	15.6	28	40.12	68	69.9	30	55.51	26	32.6	31
July 8.6	61.42	38	3.4	12	50.83	21	18.4	28	40.61	49	73.3	34	55.73	22	35.8	32
18.5	61.72	30	4.9	15	51.00	17	21.3	29	40.90	29	76.8	35	55.90	17	39.0	32
28.5	61.96	24	6.7	18	51.12	12	24.1	28	40.98	8	80.4	36	56.02	12	42.3	33
Aug. 7.5	62.12	16	8.7	20	51.19	7	26.8	27	40.84	14	84.0	36	56.09	7	45.5	32
17.5	62.19	7	10.8	21	51.22	3	29.3	25	40.50	34	87.6	36	56.10	1	48.5	30
27.4	62.18	1	12.9	21	51.20	2	31.6	23	39.96	54	91.1	35	56.05	5	51.3	28
Sept. 6.4	62.09	9	15.0	21	51.13	7	33.7	21	39.24	72	94.4	33	55.96	9	53.9	26
16.4	61.93	16	16.9	19	51.03	10	35.4	17	38.34	90	97.4	30	55.83	13	56.1	22
26.4	61.70	23	18.7	18	50.90	13	36.9	15	37.29	105	100.1	27	55.66	17	58.0	19
Oct. 6.3	61.43	27	20.2	15	50.74	16	38.0	11	36.12	117	102.4	23	55.46	20	59.5	15
16.3	61.13	30	21.3	11	50.56	18	38.7	7	34.85	127	104.2	18	55.24	22	60.6	11
26.3	60.81	32	22.0	7	50.38	18	39.0	3	33.51	134	105.5	13	55.01	23	61.2	6
Nov. 5.2	60.49	32	22.2	2	50.20	18	38.9	1	32.13	138	106.3	8	54.78	23	61.4	2
15.2	60.18	31	22.0	2	50.03	17	38.5	4	30.75	138	106.5	2	54.56	22	61.1	3
25.2	59.91	27	21.4	6	49.87	16	37.6	9	29.41	134	106.1	4	54.35	21	60.3	8
Dec. 5.2	59.69	22	20.3	11	49.74	13	36.4	12	28.14	127	105.1	10	54.17	18	59.0	13
15.1	59.52	17	18.8	15	49.63	11	34.8	16	26.98	116	103.6	15	54.02	15	57.3	17
25.1	59.41	11	17.0	18	49.56	7	33.0	18	25.96	102	101.6	20	53.90	12	55.2	21
35.1	59.37	4	14.8	22	49.52	4	30.9	21	25.12	84	99.1	25	53.82	8	52.8	24
Sec δ, Tan δ	1.930		−1.650		1.130		+0.525		5.889		+5.804		1.322		+0.864	
Mean Place	56ˢ.418		12″.05		48ˢ.556		20″.88		36ˢ.854		82″.27		53ˢ.512		40″.27	
$D'_\psi\,\alpha$, $D_\omega\,\alpha$	+0.03		+0.07		−0.01		−0.02		−0.11		−0.26		−0.02		−0.04	
$D_\psi\,\delta$, $D_\omega\,\delta$	+0.3		−0.7		+0.3		−0.7		+0.3		−0.7		+0.3		−0.7	

an Solar Date.	α Octantis. Mag. 5.2				γ Microscopii. Mag. 4.7				θ Capricorni. Mag. 4.2				ξ Cygni. Mag. 3.9			
	Right Ascension.		Declination S.		Right Ascension.		Declination S.		Right Ascension.		Declination S.		Right Ascension.		Declination N.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	20 54		−77 21		20 55		−32 36		21 0		−17 34		21 1		+43 34	
	s		″		s		″		s		″		s		″	
l. 1.1	0.85		57.7		52.20		23.1		58.60		71.9		41.59		35.1	
11.1	0.70	15	54.6	31	52.22	2	22.3	8	58.62	2	71.8	1	41.52	7	32.5	26
21.0	0.72	2	51.4	32	52.28	6	21.3	10	58.67	5	71.7	1	41.49	3	29.7	28
31.0	0.91	19	48.1	33	52.38	10	20.1	12	58.76	9	71.5	2	41.52	3	26.8	29
ɔ. 10.0	1.26	35	44.7	34	52.52	14	18.9	12	58.87	11	71.2	3	41.59	7	24.0	28
20.0	1.77	51	41.3	34	52.69	17	17.5	14	59.02	15	70.7	5	41.70	11	21.3	27
29.9	2.43	66	38.1	32	52.90	21	16.0	15	59.20	18	70.0	7	41.87	17	18.9	24
ır. 10.9	3.22	79	35.1	30	53.14	24	14.5	15	59.41	21	69.2	8	42.09	22	16.8	21
20.9	4.12	90	32.3	28	53.41	27	12.9	16	59.64	23	68.2	10	42.35	26	15.1	17
30.9	5.12	100	29.8	25	53.70	29	11.3	16	59.90	26	67.1	11	42.64	29	13.9	12
ɔr. 9.8	6.20	108	27.7	21	54.02	32	9.7	16	60.19	29	65.8	13	42.96	32	13.3	6
19.8	7.33	113	26.0	17	54.37	35	8.1	16	60.49	30	64.4	14	43.31	35	13.3	0
29.8	8.51	118	24.8	12	54.72	35	6.6	15	60.81	32	63.0	14	43.68	37	13.9	6
ay 9.7	9.71	120	24.0	8	55.09	37	5.2	14	61.14	33	61.5	15	44.06	38	15.0	11
19.7	10.90	119	23.6	4	55.46	37	3.9	13	61.48	34	60.0	15	44.43	37	16.6	16
29.7	12.05	115	23.8	2	55.83	37	2.9	10	61.80	32	58.5	15	44.80	37	18.7	21
me 8.7	13.16	111	24.4	6	56.18	35	2.0	9	62.12	32	57.1	14	45.14	34	21.2	25
18.6	14.17	101	25.5	11	56.51	33	1.4	6	62.43	31	55.9	12	45.45	31	24.0	28
28.6	15.08	91	27.0	15	56.81	30	1.0	4	62.71	28	54.8	11	45.73	28	27.1	31
ıly 8.6	15.86	78	28.9	19	57.08	27	0.9	1	62.95	24	53.8	10	45.96	23	30.3	32
18.5	16.49	63	31.2	23	57.31	23	1.0	1	63.15	20	53.1	7	46.14	18	33.6	33
28.5	16.96	47	33.7	25	57.49	18	1.4	4	63.32	17	52.6	5	46.27	13	36.9	33
ıg. 7.5	17.24	28	36.3	26	57.61	12	2.0	6	63.44	12	52.3	3	46.34	7	40.2	33
17.5	17.33	9	39.1	28	57.68	7	2.8	8	63.51	7	52.2	1	46.36	2	43.4	32
27.4	17.24	9	41.9	28	57.71	3	3.7	9	63.53	2	52.3	1	46.32	4	46.4	30
pt. 6.4	16.97	27	44.5	26	57.68	3	4.7	10	63.51	2	52.5	2	46.23	9	49.1	27
16.4	16.53	44	46.9	24	57.60	8	5.7	10	63.45	6	52.8	3	46.10	13	51.5	24
26.4	15.94	59	49.0	21	57.48	12	6.7	10	63.35	10	53.3	5	45.92	18	53.6	21
t. 6.3	15.23	71	50.7	17	57.34	14	7.7	10	63.23	12	53.8	5	45.72	20	55.2	16
16.3	14.43	80	52.0	13	57.18	16	8.5	8	63.09	14	54.3	5	45.49	23	56.4	12
26.3	13.58	85	52.7	7	57.01	17	9.2	7	62.94	15	54.8	5	45.25	24	57.2	8
ɔv. 5.2	12.71	87	52.8	1	56.84	17	9.7	5	62.80	14	55.3	5	45.01	24	57.5	3
15.2	11.87	84	52.3	5	56.68	16	9.9	2	62.67	13	55.7	4	44.77	24	57.3	2
25.2	11.09	78	51.3	10	56.54	14	10.0	1	62.55	12	56.1	4	44.54	23	56.6	7
c. 5.2	10.40	69	49.8	15	56.43	11	9.8	2	62.46	9	56.4	3	44.34	20	55.4	12
15.1	9.83	57	47.7	21	56.35	8	9.4	4	62.40	6	56.6	2	44.17	17	53.8	16
25.1	9.41	42	45.2	25	56.31	4	8.8	6	62.36	4	56.7	1	44.03	14	51.7	21
35.1	9.15	26	42.3	29	56.31	0	8.1	7	62.35	1	56.8	1	43.94	9	49.4	23
δ, Tan δ	4.570		−4.460		1.187		−0.639		1.049		−0.317		1.380		+0.952	
n Place	5ˢ.496		38″.62		53ˢ.826		8″.18		60ˢ.124		59″.44		43ˢ.768		35″.20	
a, Dω a	+0.09		+0.20		+0.01		+0.03		+0.01		+0.02		−0.02		−0.05	
, Dω δ	+0.3		−0.7		+0.3		−0.7		+0.3		−0.7		+0.3		−0.7	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	61¹ Cygni. Mag. 5.6				ν Aquarii. Mag. 4.5				Bradley 2777. Mag. 5.9				8 Piscis Australis. Mag. 5.6			
	Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination S.	
	h m 21 2 s		° ′ +38 18 ″		h m 21 4 s		° ′ −11 43 ″		h m 21 7 s		° ′ +77 45 ″		h m 21 8 s		° ′ −27 58 ″	
Jan. 1.1	55.00	3	56.8	24	46.59	1	53.6	3	10.26	60	75.4	26	2.86	1	58.1	6
11.1	54.97	0	54.4	25	46.60	5	53.9	3	9.66	44	72.8	30	2.87	5	57.5	7
21.0	54.97	4	51.9	26	46.65	8	54.2	1	9.22	26	69.8	32	2.92	8	56.8	9
31.0	55.01	9	49.3	26	46.73	11	54.3	0	8.96	6	66.6	33	3.00	12	55.9	10
Feb. 10.0	55.10	13	46.7	24	46.84	14	54.3	2	8.90	13	63.3	33	3.12	15	54.9	12
20.0	55.23	18	44.3	21	46.98	17	54.1	3	9.03	33	60.0	31	3.27	19	53.7	13
29.9	55.41	22	42.2	18	47.15	20	53.8	5	9.36	50	56.9	28	3.46	21	52.4	13
Mar. 10.9	55.63	25	40.4	13	47.35	22	53.3	7	9.86	66	54.1	25	3.67	25	51.1	15
20.9	55.88	29	39.1	9	47.57	25	52.6	9	10.52	81	51.6	19	3.92	28	49.6	15
30.9	56.17	32	38.2	3	47.82	28	51.7	11	11.33	91	49.7	14	4.20	30	48.1	16
Apr. 9.8	56.49	34	37.9	2	48.10	29	50.6	13	12.24	99	48.3	8	4.50	32	46.5	16
19.8	56.83	36	38.1	8	48.39	31	49.3	15	13.23	103	47.5	1	4.82	34	44.9	16
29.8	57.19	37	38.9	13	48.70	32	47.8	15	14.26	103	47.4	5	5.16	35	43.3	15
May 9.7	57.56	36	40.2	18	49.02	33	46.3	16	15.29	102	47.9	11	5.51	36	41.8	14
19.7	57.92	36	42.0	22	49.35	32	44.7	16	16.31	95	49.0	16	5.87	35	40.4	13
29.7	58.28	33	44.2	26	49.67	31	43.1	16	17.26	87	50.6	22	6.22	34	39.1	11
June 8.7	58.61	31	46.8	29	49.98	30	41.5	15	18.13	77	52.8	26	6.56	33	38.0	9
18.6	58.92	27	49.7	31	50.28	27	40.0	14	18.90	63	55.4	30	6.89	30	37.1	7
28.6	59.19	24	52.8	32	50.55	24	38.6	12	19.53	48	58.4	33	7.19	27	36.4	5
July 8.6	59.43	19	56.0	33	50.79	20	37.4	10	20.01	33	61.7	35	7.46	23	35.9	1
18.6	59.62	13	59.3	33	50.99	16	36.4	9	20.34	16	65.2	37	7.69	18	35.8	0
28.5	59.75	8	62.6	32	51.15	12	35.5	7	20.50	2	68.9	37	7.87	13	35.8	3
Aug. 7.5	59.83	3	65.8	31	51.27	7	34.8	4	20.48	18	72.6	37	8.00	9	36.1	5
17.5	59.86	2	68.9	28	51.34	3	34.4	3	20.30	34	76.3	36	8.09	3	36.6	6
27.4	59.84	7	71.7	26	51.37	2	34.1	1	19.96	49	79.9	34	8.12	2	37.2	8
Sept. 6.4	59.77	11	74.3	23	51.35	6	34.0	1	19.47	64	83.3	31	8.10	6	38.0	9
16.4	59.66	14	76.6	19	51.29	9	34.1	2	18.83	77	86.4	28	8.04	9	38.9	9
26.4	59.52	18	78.5	16	51.20	12	34.3	3	18.06	87	89.2	25	7.95	13	39.8	9
Oct. 6.3	59.34	20	80.1	11	51.08	13	34.6	3	17.19	96	91.7	20	7.82	15	40.7	8
16.3	59.14	20	81.2	7	50.95	14	34.9	4	16.23	102	93.7	15	7.67	16	41.5	7
26.3	58.94	21	81.9	2	50.81	14	35.3	5	15.21	106	95.2	10	7.51	15	42.2	5
Nov. 5.3	58.73	20	82.1	2	50.67	13	35.8	5	14.15	107	96.2	5	7.36	15	42.7	4
15.2	58.53	18	81.9	7	50.54	11	36.3	5	13.08	106	96.7	2	7.21	14	43.1	3
25.2	58.35	16	81.2	11	50.43	9	36.8	4	12.02	101	96.5	8	7.07	11	43.4	0
Dec. 5.2	58.19	14	80.1	16	50.34	7	37.2	4	11.01	93	95.7	13	6.96	8	43.4	2
15.1	58.05	10	78.5	18	50.27	4	37.6	4	10.08	83	94.4	19	6.88	4	43.2	3
25.1	57.95	6	76.7	21	50.23	0	38.0	3	9.25	69	92.5	24	6.84	1	42.9	5
35.1	57.89		74.6		50.23		38.3		8.56		90.1		6.83		42.4	
Sec δ, Tan δ	1.275		+0.790		1.021		−0.207		4.721		+4.614		1.133		−0.531	
Mean Place	57ˢ.039		58″.07		48ˢ.096		42″.38		16ˢ.903		70″.89		4ˢ.389		43″.68	
$D'_\psi \alpha$, $D_\omega \alpha$	−0.01		−0.04		0.00		+0.01		−0.08		−0.22		+0.01		+0.03	
$D'_\psi \delta$, $D_\omega \delta$	+0.3		−0.7		+0.3		−0.7		+0.3		−0.7		+0.3		−0.7	

ean Solar Date.	ζ Cygni. Mag. 3.4				τ Cygni. Mag. 3.8				α Equulei. Mag. 4.1				σ Cygni. Mag. 4.3			
	Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination N.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	21 9		+29 51		21 11		+37 39		21 11		+ 4 52		21 13		+39 1	
	s		″		s		″		s		″		s		″	
n. 1.1	9.60		53.4		14.69		69.0		23.98		53.1		55.52		31.8	
11.1	9.56	4	51.2	22	14.63	6	66.7	23	23.98	0	52.0	11	55.46	6	29.5	23
21.1	9.56	0	48.9	23	14.61	2	64.1	26	24.01	3	50.8	12	55.43	3	26.9	26
31.0	9.60	4	46.6	23	14.63	2	61.5	26	24.07	6	49.7	11	55.44	1	24.2	27
b. 10.0	9.67	7	44.3	23	14.69	6	58.9	26	24.16	9	48.7	10	55.50	6	21.6	26
20.0	9.78	11	42.1	22	14.80	11	56.4	25	24.28	12	47.8	9	55.61	11	19.0	26
29.9	9.93	15	40.2	19	14.95	15	54.2	22	24.43	15	47.2	6	55.76	15	16.7	23
ar. 10.9	10.12	19	38.6	16	15.15	20	52.3	19	24.61	18	46.9	3	55.95	19	14.7	20
20.9	10.35	23	37.4	12	15.38	23	50.8	15	24.82	21	46.8	1	56.18	23	13.2	15
30.9	10.60	25	36.7	7	15.65	27	49.8	10	25.06	24	47.0	2	56.45	27	12.1	11
r. 9.8	10.88	28	36.4	3	15.95	30	49.3	5	25.32	26	47.6	6	56.75	30	11.5	6
19.8	11.19	31	36.7	3	16.28	33	49.3	0	25.60	28	48.5	9	57.08	33	11.5	0
29.8	11.52	33	37.5	8	16.62	34	49.9	6	25.90	30	49.7	12	57.43	35	12.0	5
y 9.8	11.85	33	38.7	12	16.98	36	51.1	12	26.21	31	51.2	15	57.79	36	13.1	11
19.7	12.19	34	40.3	16	17.33	35	52.7	16	26.53	32	52.9	17	58.15	36	14.7	16
29.7	12.52	33	42.4	21	17.68	35	54.7	20	26.84	31	54.8	19	58.50	35	16.7	20
ne 8.7	12.83	31	44.8	24	18.01	33	57.1	24	27.15	31	56.8	20	58.84	34	19.1	24
18.6	13.12	29	47.4	26	18.32	31	59.9	28	27.44	29	58.9	21	59.16	32	21.8	27
28.6	13.39	27	50.2	28	18.60	28	62.8	29	27.70	26	61.0	21	59.44	28	24.8	30
ly 8.6	13.62	23	53.1	29	18.83	23	65.9	31	27.93	23	63.0	20	59.68	24	27.9	31
18.6	13.80	18	56.0	29	19.02	19	69.1	32	28.12	19	64.9	19	59.87	19	31.1	32
28.5	13.94	14	58.9	29	19.17	15	72.3	32	28.28	16	66.7	18	60.02	15	34.3	32
g. 7.5	14.04	10	61.8	29	19.26	9	75.5	32	28.39	11	68.3	16	60.11	9	37.5	32
17.5	14.08	4	64.4	26	19.29	3	78.5	30	28.45	6	69.7	14	60.15	4	40.6	31
27.4	14.08	0	66.9	25	19.28	1	81.3	28	28.48	3	71.0	13	60.13	2	43.4	28
pt. 6.4	14.03	5	69.1	22	19.22	6	83.8	25	28.46	2	72.0	10	60.07	6	46.0	26
16.4	13.94	9	71.1	20	19.11	11	86.1	23	28.40	6	72.8	8	59.97	10	48.4	24
26.4	13.82	12	72.7	16	18.97	14	88.0	19	28.31	9	73.3	5	59.83	14	50.4	20
t. 6.3	13.67	15	74.0	13	18.80	17	89.6	16	28.20	11	73.6	3	59.65	18	52.0	16
16.3	13.50	17	74.9	9	18.61	19	90.8	12	28.07	13	73.8	2	59.45	20	53.2	12
26.3	13.32	18	75.4	5	18.41	20	91.5	7	27.93	14	73.7	1	59.24	21	54.0	8
v. 5.3	13.14	18	75.5	1	18.20	21	91.8	3	27.79	14	73.4	3	59.03	21	54.4	4
15.2	12.96	18	75.2	3	17.99	21	91.7	1	27.66	13	72.9	5	58.82	21	54.2	2
25.2	12.80	16	74.6	6	17.80	19	91.1	6	27.54	12	72.3	6	58.62	20	53.6	6
c. 5.2	12.65	15	73.5	11	17.63	17	90.0	11	27.44	10	71.5	8	58.44	18	52.6	10
15.1	12.53	12	72.0	15	17.48	15	88.5	15	27.36	8	70.6	9	58.28	16	51.1	15
25.1	12.44	9	70.3	17	17.36	12	86.6	19	27.31	5	69.6	10	58.15	13	49.2	19
35.1	12.38	6	68.3	20	17.28	8	84.4	22	27.29	2	68.5	11	58.06	9	47.0	22
δ, Tan δ	1.153		+0.574		1.263		+0.772		1.004		+0.086		1.287		+0.811	
n Place	$11^{s}.416$		55″.65		$16^{s}.666$		69″.64		$25^{s}.510$		60″.68		$57^{s}.527$		32″.03	
a, $D_\omega a$	−0.01		−0.03		−0.01		−0.04		0.00		0.00		−0.01		−0.04	
, $D_\omega \delta$	+0.3		−0.7		+0.3		−0.7		+0.3		−0.7		+0.3		−0.7	

Mean Solar Date.	θ¹ Microscopii. Mag. 4.9				α Cephei. Mag. 2.6				ι Capricorni. Mag. 4.3				1 Pegasi. Mag. 4.2			
	Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Decli tion	
	h m 21 15		° ′ −41 10		h m 21 16		° ′ +62 12		h m 21 17		° ′ −17 12		h m 21 17		° +19	
	s		″		s		″		s		″		s		″	
Jan. 1.1	6.45	1	72.3	13	25.68	22	48.6	26	19.48	0	47.8	0	59.36	3	35.0	
11.1	6.44	4	71.0	15	25.46	15	46.0	30	19.48	4	47.8	1	59.33	1	33.3	
21.1	6.48	8	69.5	17	25.31	7	43.0	31	19.52	7	47.7	3	59.34	4	31.5	
31.0	6.56	13	67.8	18	25.24	1	39.9	32	19.59	10	47.4	4	59.38	7	29.6	
Feb. 10.0	6.69	16	66.0	20	25.25	10	36.7	32	19.69	13	47.0	4	59.45	11	27.8	
20.0	6.85	20	64.0	20	25.35	18	33.5	30	19.82	16	46.6	7	59.56	14	26.2	
29.9	7.05	24	62.0	20	25.53	25	30.5	26	19.98	19	45.9	9	59.70	18	24.8	
Mar. 10.9	7.29	28	60.0	21	25.78	33	27.9	23	20.17	22	45.0	10	59.88	21	23.7	
20.9	7.57	31	57.9	20	26.11	40	25.6	18	20.39	25	44.0	12	60.09	24	22.9	
30.9	7.88	34	55.9	20	26.51	44	23.8	12	20.64	27	42.8	14	60.33	26	22.6	
Apr. 9.8	8.22	36	53.9	19	26.95	49	22.6	6	20.91	30	41.4	14	60.59	29	22.6	
19.8	8.58	38	52.0	17	27.44	51	22.0	0	21.21	31	40.0	16	60.88	30	23.1	
29.8	8.96	40	50.3	15	27.95	53	22.0	7	21.52	33	38.4	16	61.18	32	24.1	
May 9.8	9.36	41	48.8	13	28.48	52	22.7	12	21.85	34	36.8	16	61.50	32	25.4	
19.7	9.77	41	47.5	11	29.00	51	23.9	18	22.19	33	35.2	15	61.82	32	27.1	
29.7	10.18	39	46.4	7	29.51	47	25.7	23	22.52	32	33.7	15	62.14	31	29.1	22
June 8.7	10.57	37	45.7	5	29.98	43	28.0	28	22.84	31	32.2	14	62.45	29	31.3	24
18.6	10.94	35	45.2	1	30.41	38	30.8	31	23.15	28	30.8	12	62.74	27	33.7	25
28.6	11.29	31	45.1	2	30.79	30	33.9	33	23.43	26	29.6	10	63.01	23	36.2	26
July 8.6	11.60	27	45.3	4	31.09	24	37.2	35	23.69	22	28.6	8	63.24	20	38.8	26
18.6	11.87	21	45.7	8	31.33	16	40.7	37	23.91	18	27.8	6	63.44	15	41.4	25
28.5	12.08	16	46.5	10	31.49	7	44.4	37	24.09	13	27.2	4	63.59	11	43.9	24
Aug. 7.5	12.24	10	47.5	12	31.56	0	48.1	36	24.22	8	26.8	2	63.70	6	46.3	22
17.5	12.34	4	48.7	14	31.56	9	51.7	35	24.30	4	26.6	1	63.76	2	48.5	20
27.5	12.38	2	50.1	15	31.47	16	55.2	33	24.34	0	26.7	2	63.78	2	50.5	18
Sept. 6.4	12.36	7	51.6	14	31.31	23	58.5	30	24.34	5	26.9	3	63.76	7	52.3	15
16.4	12.29	11	53.0	14	31.08	29	61.5	27	24.29	8	27.2	5	63.69	10	53.8	13
26.4	12.18	15	54.4	14	30.79	34	64.2	23	24.21	11	27.7	5	63.59	12	55.1	9
Oct. 6.3	12.03	18	55.8	11	30.45	38	66.5	18	24.10	13	28.2	6	63.47	14	56.0	6
16.3	11.85	19	56.9	9	30.07	41	68.3	14	23.97	14	28.8	5	63.33	15	56.6	4
26.3	11.66	20	57.8	6	29.66	42	69.7	8	23.83	14	29.3	5	63.18	15	57.0	0
Nov. 5.3	11.46	19	58.4	4	29.24	42	70.5	3	23.69	13	29.8	5	63.03	15	57.0	4
15.2	11.27	17	58.8	0	28.82	42	70.8	3	23.56	13	30.3	5	62.88	14	56.6	6
25.2	11.10	14	58.8	4	28.40	39	70.5	8	23.43	10	30.8	3	62.74	12	56.0	
Dec. 5.2	10.96	11	58.4	6	28.01	36	69.7	14	23.33	7	31.1	2	62.62	10	55.0	
15.2	10.85	7	57.8	9	27.65	31	68.3	20	23.26	5	31.3	2	62.52	8	53.8	
25.1	10.78	4	56.9	12	27.34	25	66.3	24	23.21	1	31.5	0	62.44	4	52.4	
35.1	10.74		55.7		27.09		63.9		23.20		31.5		62.40		50.8	
Sec δ, Tan δ	1.328		−0.875		2.145		+1.898		1.047		−0.310		1.061		+0.353	
Mean Place	8ˢ.064		55″.50		28ˢ.848		44″.88		20ˢ.930		35″.40		60ˢ.994		39″.13	
D′ψ α, Dω α	+0.02		+0.04		−0.03		−0.10		+0.01		+0.02		−0.01		−0.02	
Dψ δ, Dω δ	+0.3		−0.7		+0.3		−0.7		+0.3		−0.7		+0.3		−0.6	

n Solar Date.	γ Pavonis. Mag. 4.3				ζ Capricorni. Mag. 3.9				g Cygni. Mag. 5.3				β Aquarii. Mag. 3.1			
	Right Ascension.		Declination S.		Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination S.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	21 19		−65 45		21 21		−22 47		21 26		+46 8		21 26		− 5 57	
	s		″		s		″		s		″		s		″	
ı. 1.1	8.49		74.6		37.30		48.4		9.89		70.0		54.22		41.6	
11.1	8.40	9	72.1	25	37.30	0	48.1	3	9.78	11	67.6	24	54.21	1	42.2	6
21.1	8.39	1	69.3	28	37.33	3	47.6	5	9.72	6	64.9	27	54.24	3	42.7	5
31.0	8.47	8	66.4	29	37.40	7	47.0	6	9.71	1	62.1	28	54.29	5	43.2	5
ɔ. 10.0	8.63	16	63.3	31	37.50	10	46.3	7	9.74	3	59.2	29	54.37	8	43.5	3
20.0	8.87	24	60.1	32	37.63	13	45.4	9	9.83	9	56.5	27	54.49	12	43.6	1
29.9	9.19	32	57.0	31	37.79	16	44.4	10	9.96	13	53.9	26	54.63	14	43.6	0
r. 10.9	9.58	39	54.0	30	37.99	20	43.2	12	10.15	19	51.6	23	54.80	17	43.3	3
20.9	10.03	45	51.2	28	38.21	22	41.9	13	10.39	24	49.8	18	55.00	20	42.8	5
30.9	10.54	51	48.5	27	38.47	26	40.5	14	10.67	28	48.4	14	55.23	23	42.1	7
r. 9.8	11.11	57	46.1	24	38.75	28	38.9	16	10.99	32	47.5	9	55.49	26	41.1	10
19.8	11.72	61	44.0	21	39.05	30	37.3	16	11.34	35	47.2	3	55.77	28	39.9	12
29.8	12.36	64	42.2	18	39.37	32	35.7	16	11.71	37	47.5	3	56.07	30	38.5	14
ıy 9.8	13.03	67	40.8	14	39.71	34	34.1	16	12.10	39	48.3	8	56.38	31	36.9	16
19.7	13.70	67	39.9	9	40.05	34	32.5	16	12.50	40	49.7	14	56.70	32	35.2	17
29.7	14.37	67	39.4	5	40.39	34	31.0	15	12.88	38	51.6	19	57.02	32	33.4	18
ıne 8.7	15.02	65	39.3	1	40.73	34	29.6	14	13.25	37	53.9	23	57.33	31	31.6	18
18.6	15.63	61	39.6	3	41.05	32	28.4	12	13.60	35	56.6	27	57.63	30	29.8	18
28.6	16.20	57	40.4	8	41.34	29	27.4	10	13.91	31	59.6	30	57.91	28	28.1	17
ıly 8.6	16.70	50	41.6	12	41.61	27	26.6	8	14.17	26	62.8	32	58.16	25	26.5	16
18.6	17.13	43	43.2	16	41.84	23	26.1	5	14.38	21	66.1	33	58.37	21	25.1	14
28.5	17.46	33	45.1	19	42.03	19	25.8	3	14.54	16	69.5	34	58.55	18	23.8	13
ug. 7.5	17.70	24	47.3	22	42.17	14	25.8	0	14.65	11	72.9	34	58.68	13	22.8	10
17.5	17.84	14	49.6	23	42.27	10	26.0	2	14.70	5	76.2	33	58.77	9	21.9	9
27.5	17.88	4	52.0	24	42.31	4	26.3	3	14.69	1	79.4	32	58.81	4	21.3	6
pt. 6.4	17.82	6	54.4	24	42.31	0	26.8	5	14.62	7	82.3	29	58.81	0	20.9	4
16.4	17.66	16	56.7	23	42.26	5	27.5	7	14.51	11	85.0	27	58.77	4	20.6	3
26.4	17.41	25	58.8	21	42.18	8	28.2	7	14.35	16	87.4	24	58.70	7	20.5	1
ct. 6.3	17.10	31	60.6	18	42.07	11	28.9	7	14.16	19	89.3	19	58.60	10	20.6	1
16.3	16.73	37	62.1	15	41.94	13	29.6	7	13.94	22	90.9	16	58.48	12	20.8	2
26.3	16.32	41	63.2	11	41.80	14	30.3	7	13.70	24	92.0	11	58.35	13	21.2	4
ov. 5.3	15.90	42	63.7	5	41.65	15	30.9	6	13.46	24	92.6	6	58.22	13	21.6	4
15.2	15.48	42	63.7	0	41.51	14	31.4	5	13.21	25	92.8	2	58.09	13	22.1	5
25.2	15.09	39	63.2	5	41.38	13	31.7	3	12.97	24	92.4	4	57.98	11	22.6	5
ec. 5.2	14.74	35	62.2	10	41.27	11	31.9	2	12.75	22	91.5	9	57.88	10	23.2	6
15.2	14.45	29	60.7	15	41.19	8	32.0	1	12.55	20	90.1	14	57.80	8	23.8	6
25.1	14.23	22	58.8	19	41.14	5	31.9	1	12.38	17	88.3	18	57.75	5	24.4	6
35.1	14.09	14	56.5	23	41.11	3	31.7	2	12.25	13	86.1	22	57.72	3	25.0	6
δ, Tan δ	2.435		−2.220		1.085		−0.420		1.443		+1.041		1.006		−0.104	
n Place	10ˢ.863		54″.79		38ˢ.741		34″.78		12ˢ.078		68″.08		55ˢ.643		31″.79	
α, $D_\omega \alpha$	+0.04		+0.11		+0.01		+0.02		−0.02		−0.05		0.00		+0.01	
, $D_\omega \delta$	+0.3		−0.6		+0.3		−0.6		+0.3		−0.6		+0.3		−0.6	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	β Cephei. Mag. 3.3				ξ Aquarii. Mag. 4.8				74 Cygni. Mag. 5.1				γ Capric Mag. 3	
	Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.	
	h m 21 27		° ′ +70 10		h m 21 33		° ′ − 8 14		h m 21 33		° ′ +40 0		h m 21 35	
	s		″		s		″		s		″		s	
Jan. 1.1	27.62		32.8		2.72		67.8		23.31		65.2		11.68	
11.1	27.25	37	30.3	25	2.71	1	68.3	5	23.22	9	63.0	22	11.66	2
21.1	26.98	27	27.5	28	2.73	2	68.7	4	23.17	5	60.5	25	11.68	2
31.0	26.81	17	24.4	31	2.77	4	69.0	3	23.16	1	57.9	26	11.73	5
Feb. 10.0	26.76	5	21.1	33	2.85	8	69.1	1	23.20	4	55.2	27	11.81	8
20.0	26.82	6	17.8	33	2.96	11	69.1	0	23.28	8	52.7	25	11.92	11
Mar. 1.0	27.00	18	14.7	31	3.10	14	68.9	2	23.40	12	50.3	24	12.06	14
10.9	27.29	29	11.9	28	3.27	17	68.5	4	23.57	17	48.2	21	12.24	18
20.9	27.69	40	9.4	25	3.47	20	67.9	6	23.79	22	46.5	17	12.44	20
30.9	28.18	49	7.4	20	3.69	22	67.0	9	24.05	26	45.3	12	12.68	24
Apr. 9.8	28.75	57	5.9	15	3.95	26	65.9	11	24.34	29	44.6	7	12.94	26
19.8	29.38	63	5.0	9	4.23	28	64.6	13	24.66	32	44.4	2	13.22	28
29.8	30.04	66	4.8	2	4.53	30	63.1	15	25.01	35	44.8	4	13.53	31
May 9.8	30.73	69	5.1	3	4.84	31	61.5	16	25.37	36	45.7	9	13.86	33
19.7	31.41	68	6.1	10	5.16	32	59.8	17	25.74	37	47.1	14	14.19	33
29.7	32.07	66	7.7	16	5.48	32	58.1	17	26.10	36	48.9	18	14.52	33
June 8.7	32.70	63	9.8	21	5.80	32	56.3	18	26.45	35	51.2	23	14.85	33
18.7	33.26	56	12.3	25	6.10	30	54.6	17	26.78	33	53.8	26	15.17	32
28.6	33.75	49	15.2	29	6.38	28	52.9	17	27.08	30	56.7	29	15.47	30
July 8.6	34.15	40	18.5	33	6.64	26	51.4	15	27.34	26	59.8	31	15.74	27
18.6	34.45	30	22.0	35	6.86	22	50.1	13	27.56	22	63.0	32	15.97	23
28.5	34.65	20	25.7	37	7.05	19	49.0	11	27.73	17	66.3	33	16.16	19
Aug. 7.5	34.75	10	29.4	37	7.19	14	48.0	10	27.84	11	69.5	32	16.31	15
17.5	34.73	2	33.1	37	7.28	9	47.2	8	27.90	6	72.6	31	16.42	11
27.5	34.61	12	36.7	36	7.33	5	46.7	5	27.92	2	75.6	30	16.47	5
Sept. 6.4	34.39	22	40.2	35	7.34	1	46.4	3	27.88	4	78.3	27	16.48	1
16.4	34.08	31	43.5	33	7.31	3	46.3	1	27.80	8	80.8	25	16.45	3
26.4	33.68	40	46.4	29	7.24	7	46.3	0	27.67	13	83.0	22	16.39	6
Oct. 6.4	33.21	47	49.0	26	7.14	10	46.5	2	27.51	16	84.8	18	16.29	10
16.3	32.68	53	51.2	22	7.03	11	46.8	3	27.33	18	86.3	15	16.17	12
26.3	32.10	58	52.9	17	6.91	12	47.2	4	27.13	20	87.3	10	16.04	13
Nov. 5.3	31.50	60	54.0	11	6.78	13	47.7	5	26.92	21	87.8	5	15.90	14
15.2	30.88	62	54.6	6	6.65	13	48.2	5	26.71	21	87.9	1	15.76	14
25.2	30.27	61	54.6	0	6.53	12	48.7	5	26.50	21	87.5	4	15.64	12
Dec. 5.2	29.68	59	54.0	6	6.43	10	49.2	5	26.31	19	86.7	8	15.54	10
15.2	29.13	55	52.8	12	6.35	8	49.8	6	26.14	17	85.4	13	15.46	8
25.1	28.64	49	51.1	17	6.29	6	50.3	5	26.00	14	83.7	17	15.40	6
35.1	28.22	42	48.9	22	6.26	3	50.8	5	25.90	10	81.7	20	15.37	3
Sec δ, Tan δ	2.948		+2.774		1.010		−0.145		1.305		+0.840		1.046	
Mean Place	31s.801		27″.33		4s.111		57″.53		25s.274		64″.02		13s.040	
$D'_\psi \alpha$, $D_\omega \alpha$	−0.05		−0.15		0.00		+0.01		−0.01		−0.04		0.00	
$D_\psi \delta$, $D_\omega \delta$	+0.3		−0.6		+0.3		−0.6		+0.3		−0.6		+0.3	

FOR THE UPPER TRANSIT AT WASHINGTON.

n Solar Date.	**λ Octantis.** Mag. 5.4 Right Ascension.		Declination S.		**ε Pegasi.** Mag. 2.5 Right Ascension.		Declination N.		**11 Cephei.** Mag. 4.8 Right Ascension.		Declination N.		**δ Capricorni.** Mag. 3.0 Right Ascension.		Declination S.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	21 37		−83 7		21 39		+ 9 28		21 40		+70 54		21 42		−16 31	
	s		″		s		″		s		″		s		″	
L. 1.1	25.88		49.8		50.37		10.2		33.95		28.4		9.80		49.7	
11.1	25.16	72	46.8	30	50.34	3	8.9	13	33.54	41	26.0	24	9.78	2	49.8	1
21.1	24.73	43	43.5	33	50.34	0	7.6	13	33.22	32	23.3	27	9.79	1	49.7	1
31.0	24.61	12	40.0	35	50.37	3	6.3	13	33.00	22	20.3	30	9.83	4	49.5	2
). 10.0	24.79	18	36.3	37	50.43	6	5.1	12	32.90	10	17.1	32	9.90	7	49.1	4
20.0	25.27	48	32.6	37	50.52	9	4.1	10	32.93	3	13.8	33	10.01	11	48.5	6
r. 1.0	26.03	76	29.0	36	50.64	12	3.3	8	33.08	15	10.7	31	10.14	13	47.8	7
10.9	27.06	103	25.5	35	50.79	15	2.7	6	33.35	27	7.8	29	10.31	17	46.9	9
20.9	28.33	127	22.2	33	50.98	19	2.4	3	33.73	38	5.2	26	10.51	20	45.8	11
30.9	29.81	148	19.2	30	51.20	22	2.4	0	34.21	48	3.0	22	10.74	23	44.6	12
r. 9.9	31.48	167	16.5	27	51.44	24	2.8	4	34.77	56	1.4	16	10.99	25	43.2	14
19.8	33.30	182	14.2	23	51.71	27	3.6	8	35.40	63	0.4	10	11.27	28	41.6	16
29.8	35.24	194	12.3	19	52.00	29	4.7	11	36.08	68	0.0	4	11.58	31	40.0	16
ay 9.8	37.26	202	10.9	14	52.31	31	6.1	14	36.79	71	0.2	2	11.90	32	38.2	18
19.7	39.31	205	10.0	9	52.63	32	7.8	17	37.50	71	1.0	8	12.23	33	36.5	17
29.7	41.35	204	9.7	3	52.95	32	9.7	19	38.20	70	2.4	14	12.56	33	34.8	17
me 8.7	43.34	199	9.8	1	53.26	31	11.8	21	38.86	66	4.3	19	12.89	33	33.2	16
18.7	45.23	189	10.5	7	53.55	29	14.0	22	39.46	60	6.7	24	13.21	32	31.7	15
28.6	46.97	174	11.7	12	53.83	28	16.2	22	39.99	53	9.5	28	13.51	30	30.3	14
ly 8.6	48.51	154	13.3	16	54.08	25	18.4	22	40.43	44	12.7	32	13.78	27	29.2	11
18.6	49.83	132	15.3	20	54.30	22	20.6	22	40.78	35	16.2	35	14.02	24	28.2	10
28.6	50.88	105	17.7	24	54.48	18	22.7	21	41.03	25	19.8	36	14.22	20	27.5	7
ug. 7.5	51.63	75	20.3	26	54.61	13	24.6	19	41.16	13	23.5	37	14.38	16	27.0	5
17.5	52.05	42	23.1	28	54.70	9	26.4	18	41.19	3	27.3	38	14.49	11	26.7	3
27.5	52.14	9	26.0	29	54.75	5	27.9	15	41.10	9	31.0	37	14.55	6	26.7	0
pt. 6.4	51.89	25	28.9	29	54.76	1	29.3	14	40.91	19	34.6	36	14.57	2	26.9	2
16.4	51.32	57	31.7	28	54.73	3	30.4	11	40.62	29	37.9	33	14.55	2	27.2	3
26.4	50.44	88	34.2	25	54.66	7	31.2	8	40.24	38	41.0	31	14.49	6	27.7	5
t. 6.4	49.30	114	36.4	22	54.56	10	31.8	6	39.79	45	43.8	28	14.40	9	28.2	5
16.3	47.94	136	38.1	17	54.45	11	32.2	4	39.27	52	46.1	23	14.28	12	28.8	6
26.3	46.41	153	39.3	12	54.32	13	32.3	1	38.69	58	48.0	19	14.15	13	29.5	7
ov. 5.3	44.79	162	39.9	6	54.18	14	32.2	1	38.08	61	49.3	13	14.02	13	30.1	6
15.3	43.13	166	39.9	0	54.05	13	31.8	4	37.45	63	50.1	8	13.88	14	30.7	6
25.2	41.50	163	39.3	6	53.93	12	31.3	5	36.82	63	50.4	3	13.76	12	31.2	5
ec. 5.2	39.98	152	38.1	12	53.82	11	30.5	8	36.20	62	50.0	4	13.65	11	31.6	4
15.2	38.62	136	36.3	18	53.72	10	29.6	9	35.62	58	49.0	10	13.56	9	31.9	3
25.1	37.47	115	34.0	23	53.65	7	28.5	11	35.09	53	47.5	15	13.50	6	32.1	2
35.1	36.57	90	31.2	28	53.61	4	27.3	12	34.63	46	45.4	21	13.47	3	32.2	1
δ, Tan δ	8.354		−8.294		1.014		+0.166		3.057		+2.889		1.043		−0.296	
n Place	31s.844		28″.51		51s.822		15″.89		38s.174		21″.77		11s.127		37″.46	
a, Dω a	+0.13		+0.45		0.00		−0.01		−0.04		−0.16		0.00		+0.02	
δ, Dω δ	+0.3		−0.6		+0.03		−0.6		+0.3		−0.6		+0.3		−0.6	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	**π² Cygni.** Mag. 4.3				**μ Capricorni.** Mag. 5.2				**γ Gruis.** Mag. 3.2				**16 Pegasi.** Mag. 5.0			
	Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination S.		Right Ascension.		Declination N.	
	h m 21 43		° ′ +48 53		h m 21 48		° ′ −13 57		h m 21 48		° ′ −37 46		h m 21 49		° ′ +25 30	
	s		″		s		″		s		″		s		″	
Jan. 1.1	30.24		71.0		28.67		71.3		34.86		62.3		1.83		37.5	
11.1	30.10	14	68.7	23	28.65	2	71.4	1	34.82	4	61.2	11	1.77	6	35.7	18
21.1	30.01	9	66.1	26	28.66	1	71.5	1	34.82	0	60.0	12	1.74	3	33.8	19
31.0	29.96	5	63.3	28	28.69	3	71.4	1	34.86	4	58.5	15	1.74	0	31.8	20
Feb. 10.0	29.97	1	60.5	28	28.75	6	71.1	3	34.93	7	56.8	17	1.78	4	29.8	20
20.0	30.03	6	57.6	29	28.85	10	70.7	4	35.04	11	55.0	18	1.85	7	27.9	19
Mar. 1.0	30.14	11	54.9	27	28.98	13	70.1	6	35.19	15	53.0	20	1.96	11	26.2	17
10.9	30.31	17	52.5	24	29.14	16	69.3	8	35.38	19	50.9	21	2.11	15	24.8	14
20.9	30.54	23	50.5	20	29.33	19	68.4	9	35.61	23	48.8	21	2.29	18	23.7	11
30.9	30.81	27	48.9	16	29.55	22	67.2	12	35.87	26	46.6	22	2.51	22	23.0	7
Apr. 9.9	31.13	32	47.8	11	29.80	25	65.9	13	36.16	29	44.4	22	2.76	25	22.7	3
19.8	31.49	36	47.3	5	30.07	27	64.4	15	36.49	33	42.3	21	3.04	28	22.9	2
29.8	31.87	38	47.3	0	30.37	30	62.7	17	36.84	35	40.3	20	3.35	31	23.6	7
May 9.8	32.27	40	47.9	6	30.68	31	61.0	17	37.21	37	38.4	19	3.67	32	24.6	10
19.7	32.68	41	49.1	12	31.01	33	59.3	17	37.60	39	36.7	17	4.00	33	26.1	15
29.7	33.08	40	50.8	17	31.34	33	57.5	18	37.99	39	35.3	14	4.33	33	28.0	19
June 8.7	33.48	40	53.0	22	31.67	33	55.7	18	38.38	39	34.1	12	4.66	33	30.2	22
18.7	33.85	37	55.5	25	31.98	31	54.1	16	38.75	37	33.2	9	4.97	31	32.6	24
28.6	34.18	33	58.4	29	32.28	30	52.6	15	39.11	36	32.6	6	5.26	29	35.2	26
July 8.6	34.47	29	61.6	32	32.56	28	51.3	13	39.43	32	32.3	3	5.52	26	37.9	27
18.6	34.71	24	64.9	33	32.80	24	50.2	11	39.71	28	32.4	1	5.74	22	40.7	28
28.6	34.90	19	68.3	34	33.00	20	49.3	9	39.95	24	32.8	4	5.93	19	43.5	28
Aug. 7.5	35.03	13	71.8	35	33.16	16	48.6	7	40.14	19	33.5	7	6.07	14	46.2	27
17.5	35.10	7	75.3	35	33.27	11	48.2	4	40.28	14	34.5	10	6.16	9	48.8	26
27.5	35.11	1	78.6	33	33.34	7	48.0	2	40.36	8	35.7	12	6.21	5	51.2	24
Sept. 6.4	35.06	5	81.7	31	33.36	2	48.0	0	40.38	2	37.0	13	6.21	0	53.4	22
16.4	34.96	10	84.5	28	33.34	2	48.2	2	40.35	3	38.4	14	6.17	4	55.3	19
26.4	34.82	14	87.1	26	33.29	5	48.5	3	40.28	7	39.8	14	6.09	8	57.0	17
Oct. 6.4	34.64	18	89.3	22	33.21	8	49.0	5	40.17	11	41.2	14	5.99	10	58.3	13
16.3	34.42	22	91.1	18	33.10	11	49.5	5	40.02	15	42.5	13	5.86	13	59.3	10
26.3	34.18	24	92.5	14	32.98	12	50.1	6	39.86	16	43.6	11	5.71	15	60.0	7
Nov. 5.3	33.92	26	93.4	9	32.85	13	50.7	6	39.68	18	44.5	9	5.56	15	60.3	3
15.3	33.66	26	93.7	3	32.72	13	51.2	5	39.51	17	45.2	7	5.40	16	60.3	0
25.2	33.41	25	93.6	1	32.60	12	51.7	5	39.34	17	45.5	3	5.25	15	59.9	4
Dec. 5.2	33.17	24	92.9	7	32.49	11	52.2	5	39.19	15	45.5	0	5.11	14	59.2	7
15.2	32.95	22	91.7	12	32.40	9	52.6	4	39.07	12	45.2	3	4.99	12	58.1	11
25.1	32.75	20	90.1	16	32.34	6	52.9	3	38.98	9	44.7	5	4.89	10	56.7	14
35.1	32.59	16	88.1	20	32.30	4	53.1	2	38.92	6	43.8	9	4.81	8	55.1	16
Sec δ, Tan δ	1.521		+1.146		1.031		−0.248		1.265		−0.775		1.108		+0.477	
Mean Place	$32^{s}.467$		$67''.44$		$29^{s}.976$		$59''.64$		$36^{s}.208$		$45''.32$		$3^{s}.440$		$38''.84$	
D′ψ α, Dω α	−0.02		−0.06		0.00		+0.01		+0.01		+0.04		−0.01		−0.03	
Dψ δ, Dω δ	+0.3		−0.6		+0.3		−0.5		+0.3		−0.5		+0.3		−0.5	

FOR THE UPPER TRANSIT AT WASHINGTON.

ean Solar Date.	**79 Draconis.** Mag. 6.6				**ε Indi.** Mag. 4.7				**20 Pegasi.** Mag. 5.7				**α Aquarii.** Mag. 3.2			
	Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination S.	
	h m 21 51		° ′ +73 16		h m 21 56		° ′ −57 8		h m 21 56		° ′ +12 41		h m 22 1		° ′ − 0 44	
	s		″		s		″		s		″		s		″	
n. 1.1	40.99	51	76.7	22	36.52	10	73.1	18	46.69	5	48.4	14	14.59	3	59.6	8
11.1	40.48	41	74.5	26	36.42	4	71.3	22	46.64	2	47.0	14	14.56	1	60.4	7
21.1	40.07	29	71.9	30	36.38	2	69.1	24	46.62	1	45.6	13	14.55	1	61.1	7
31.1	39.78	16	68.9	31	36.40	8	66.7	27	46.63	4	44.3	13	14.56	5	61.8	5
b. 10.0	39.62	2	65.8	33	36.48	13	64.0	28	46.67	8	43.0	12	14.61	7	62.3	4
20.0	39.60	12	62.5	32	36.61	20	61.2	28	46.75	10	41.8	10	14.68	11	62.7	2
ar. 1.0	39.72	26	59.3	29	36.81	25	58.4	29	46.85	14	40.8	8	14.79	13	62.9	0
10.9	39.98	39	56.4	27	37.06	30	55.5	29	46.99	17	40.0	5	14.92	17	62.9	3
20.9	40.37	51	53.7	23	37.36	36	52.6	28	47.16	20	39.5	1	15.09	20	62.6	6
30.9	40.88	61	51.4	18	37.72	40	49.8	26	47.36	24	39.4	3	15.29	23	62.0	8
pr. 9.9	41.49	69	49.6	12	38.12	45	47.2	24	47.60	26	39.7	6	15.52	26	61.2	11
19.8	42.18	75	48.4	6	38.57	48	44.8	22	47.86	29	40.3	9	15.78	29	60.1	13
29.8	42.93	79	47.8	0	39.05	51	42.6	19	48.15	31	41.2	14	16.07	30	58.8	16
y 9.8	43.72	80	47.8	6	39.56	53	40.7	15	48.46	32	42.6	16	16.37	31	57.2	18
19.8	44.52	78	48.4	12	40.09	54	39.2	11	48.78	32	44.2	19	16.68	32	55.4	19
29.7	45.30	75	49.6	18	40.63	54	38.1	7	49.10	32	46.1	21	17.00	32	53.5	19
ne 8.7	46.05	69	51.4	23	41.17	52	37.4	3	49.42	30	48.2	22	17.32	31	51.6	20
18.7	46.74	61	53.7	27	41.69	49	37.1	1	49.72	29	50.4	23	17.63	29	49.6	20
28.6	47.35	52	56.4	31	42.18	46	37.2	6	50.01	26	52.7	24	17.92	27	47.6	19
ly 8.6	47.87	42	59.5	33	42.64	40	37.8	10	50.27	23	55.1	23	18.19	24	45.7	18
18.6	48.29	30	62.8	36	43.04	34	38.8	14	50.50	19	57.4	23	18.43	20	43.9	16
28.6	48.59	18	66.4	38	43.38	27	40.2	17	50.69	15	59.7	21	18.63	16	42.3	14
g. 7.5	48.77	5	70.2	38	43.65	20	41.9	20	50.84	11	61.8	20	18.79	12	40.9	12
17.5	48.82	7	74.0	37	43.85	12	43.9	21	50.95	6	63.8	18	18.91	7	39.7	10
27.5	48.75	18	77.7	36	43.97	3	46.0	23	51.01	2	65.6	15	18.98	3	38.7	8
pt. 6.5	48.57	30	81.3	35	44.00	4	48.3	23	51.03	2	67.1	13	19.01	1	37.9	6
16.4	48.27	40	84.8	32	43.96	10	50.6	22	51.01	5	68.4	10	19.00	4	37.3	3
26.4	47.87	50	88.0	29	43.86	17	52.8	21	50.96	8	69.4	8	18.96	7	37.0	2
t. 6.4	47.37	58	90.9	25	43.69	22	54.9	19	50.88	11	70.2	5	18.89	10	36.8	0
16.3	46.79	64	93.4	21	43.47	25	56.8	15	50.77	12	70.7	3	18.79	12	36.8	2
26.3	46.15	68	95.5	16	43.22	27	58.3	11	50.65	13	71.0	0	18.67	12	37.0	3
v. 5.3	45.47	72	97.1	10	42.95	28	59.4	6	50.52	14	71.0	2	18.55	12	37.3	4
15.3	44.75	73	98.1	4	42.67	28	60.0	2	50.38	13	70.8	4	18.43	12	37.7	6
25.2	44.02	72	98.5	1	42.39	25	60.2	2	50.25	11	70.4	7	18.31	11	38.3	6
c. 5.2	43.30	69	98.4	8	42.14	22	60.0	8	50.14	10	69.7	9	18.20	9	38.9	7
15.2	42.61	63	97.6	14	41.92	18	59.2	12	50.04	9	68.8	11	18.11	7	39.6	7
25.2	41.98	56	96.2	19	41.74	12	58.0	16	49.95	6	67.7	13	18.04	5	40.3	8
35.1	41.42		94.3		41.62		56.4		49.89		66.4		17.99		41.1	
, Tan δ	3.474		+3.327		1.843		−1.549		1.025		+0.226		1.000		−0.013	
n Place	45ˢ.652		68″.97		38ˢ.054		52″.83		48ˢ.105		52″.69		15ˢ.885		51″.71	
a, Dω α	−0.05		−0.19		+0.02		+0.09		0.00		−0.01		0.00		0.00	
, Dω δ	+0.3		−0.5		+0.3		−0.5		+0.3		−0.5		+0.3		−0.5	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	ι Aquarii. Mag. 4.4				20 Cephei. Mag. 5.4				α Gruis. Mag. 2.2				ι Pegasi. Mag. 4.0			
	Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declin- tion N.	
	h m 22 1		° ′ −14 17		h m 22 2		° ′ +62 21		h m 22 2		° ′ −47 23		h m 22 2		° ′ +24	
	s		″		s		″		s		″		s		″	
Jan. 1.1	39.92		60.8		17.07		28.8		40.19		34.9		53.28		52.8	
11.1	39.88	4	61.0	2	16.79	28	26.7	21	40.12	7	33.5	14	53.21	7	51.2	[illegible]
21.1	39.87	1	61.0	0	16.57	22	24.1	26	40.08	4	31.8	17	53.17	4	49.4	[illegible]
31.1	39.90	3	60.9	1	16.41	16	21.2	29	40.09	1	29.8	20	53.16	1	47.4	[illegible]
Feb. 10.0	39.95	5	60.6	3	16.33	8	18.2	30	40.15	6	27.5	23	53.18	2	45.5	[illegible]
20.0	40.03	8	60.2	4	16.33	0	15.1	31	40.25	10	25.1	24	53.24	6	43.7	[illegible]
Mar. 1.0	40.14	11	59.6	6	16.42	9	12.0	31	40.40	15	22.6	25	53.34	10	42.0	17
10.9	40.28	14	58.7	9	16.59	17	9.2	28	40.59	19	20.0	26	53.47	13	40.6	14
20.9	40.46	18	57.7	10	16.84	25	6.7	25	40.82	23	17.4	26	53.64	17	39.5	11
30.9	40.67	21	56.4	13	17.17	33	4.6	21	41.10	28	14.8	26	53.84	20	38.8	7
Apr. 9.9	40.91	24	55.0	14	17.56	39	2.9	17	41.42	32	12.3	25	54.08	24	38.5	3
19.8	41.18	27	53.5	15	18.01	45	1.8	11	41.77	35	9.9	24	54.36	28	38.6	1
29.8	41.47	29	51.8	17	18.51	50	1.4	4	42.16	39	7.6	23	54.66	30	39.2	6
May 9.8	41.78	31	50.0	18	19.03	52	1.5	1	42.57	41	5.6	20	54.97	31	40.3	11
19.8	42.10	32	48.2	18	19.56	53	2.2	7	43.00	43	3.9	17	55.30	33	41.7	14
29.7	42.43	33	46.4	18	20.10	54	3.5	13	43.44	44	2.4	15	55.64	34	43.5	18
June 8.7	42.76	33	44.6	18	20.62	52	5.3	18	43.88	44	1.3	11	55.97	33	45.6	21
18.7	43.08	32	42.9	17	21.11	49	7.6	23	44.31	43	0.6	7	56.29	32	48.0	24
28.6	43.39	31	41.4	15	21.55	44	10.4	28	44.71	40	0.3	3	56.59	30	50.6	26
July 8.6	43.67	28	40.0	14	21.94	39	13.5	31	45.09	38	0.3	0	56.86	27	53.3	27
18.6	43.92	25	38.8	12	22.26	32	16.8	33	45.42	33	0.8	5	57.10	24	56.0	27
28.6	44.13	21	37.9	9	22.51	25	20.4	36	45.70	28	1.6	8	57.30	20	58.7	27
Aug. 7.5	44.30	17	37.3	6	22.69	18	24.1	37	45.93	23	2.7	11	57.45	15	61.4	27
17.5	44.43	13	36.8	5	22.79	10	27.8	37	46.10	17	4.1	14	57.56	11	64.0	26
27.5	44.51	8	36.6	2	22.81	2	31.4	36	46.20	10	5.8	17	57.62	6	66.4	24
Sept. 6.5	44.55	4	36.6	0	22.75	6	35.0	36	46.24	4	7.6	18	57.64	2	68.6	22
16.4	44.54	1	36.8	2	22.61	14	38.3	33	46.22	2	9.5	19	57.62	2	70.5	19
26.4	44.50	4	37.2	4	22.41	20	41.4	31	46.14	8	11.3	18	57.56	6	72.2	17
Oct. 6.4	44.42	8	37.7	5	22.15	26	44.2	28	46.01	13	13.1	18	57.47	9	73.6	14
16.3	44.32	10	38.3	6	21.84	31	46.6	24	45.85	16	14.7	16	57.35	12	74.7	11
26.3	44.20	12	38.9	6	21.49	35	48.5	19	45.66	19	16.1	14	57.21	14	75.4	7
Nov. 5.3	44.08	12	39.5	6	21.11	38	50.0	15	45.45	21	17.2	11	57.07	14	75.8	4
15.3	43.95	13	40.1	6	20.71	40	50.9	9	45.23	22	17.9	7	56.92	15	75.9	1
25.2	43.83	12	40.7	6	20.31	40	51.2	3	45.02	21	18.2	3	56.77	15	75.6	3
Dec. 5.2	43.72	11	41.2	5	19.91	40	51.0	2	44.83	19	18.2	0	56.63	14	75.0	6
15.2	43.63	9	41.6	4	19.53	38	50.2	8	44.66	17	17.8	4	56.51	12	74.0	10
25.2	43.55	8	41.9	3	19.18	35	48.9	13	44.52	14	16.9	9	56.40	11	72.7	13
35.1	43.50	5	42.1	2	18.88	30	47.0	19	44.42	10	15.7	12	56.32	8	71.2	15
Sec δ, Tan δ	1.032		−0.255		2.156		+1.909		1.477		−1.087		1.103		+0.465	
Mean Place	41ˢ.149		49″.28		20ˢ.008		21″.61		41ˢ.506		15″.97		54ˢ.820		53″.64	
D′ψ α, Dω α	0.00		+0.01		−0.02		−0.11		+0.01		+0.06		−0.01		−0.03	
Dψ δ, Dω δ	+0.3		−0.5		+0.3		−0.5		+0.3		−0.5		+0.3		−0.5	

FOR THE UPPER TRANSIT AT WASHINGTON.

an Solar Date.	θ Pegasi. Mag. 3.7				π Pegasi. Mag. 4.4				ζ Cephei. Mag. 3.6				24 Cephei. Mag. 5.0			
	Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination N		Right Ascension.		Declination N.	
	h m 22 5		° ′ + 5 45		h m 22 6		° ′ +32 44		h m 22 7		° ′ +57 45		h m 22 8		° ′ +71 54	
	s		″		s		″		s		″		s		″	
n. 1.1	44.36		46.6		3.02		47.2		45.42		69.0		2.90		36.0	
11.1	44.31	5	45.6	10	2.93	9	45.4	18	45.19	23	66.9	21	2.41	49	33.9	21
21.1	44.29	2	44.6	10	2.87	6	43.3	21	45.01	18	64.4	25	2.00	41	31.4	25
31.1	44.30	1	43.6	10	2.84	3	41.1	22	44.88	13	61.6	28	1.70	30	28.6	28
b. 10.0	44.34	4	42.7	9	2.85	1	38.9	22	44.82	6	58.6	30	1.52	18	25.5	31
20.0	44.41	7	41.9	8	2.90	5	36.7	22	44.82	0	55.6	30	1.46	6	22.3	32
ar. 1.0	44.50	9	41.3	6	2.99	9	34.6	21	44.90	8	52.7	29	1.53	7	19.1	32
11.0	44.63	13	41.0	3	3.12	13	32.8	18	45.05	15	49.9	28	1.72	19	16.1	30
20.9	44.80	17	40.9	1	3.29	17	31.3	15	45.27	22	47.5	24	2.04	32	13.3	28
30.9	45.00	20	41.1	2	3.50	21	30.2	11	45.56	29	45.5	20	2.48	44	11.0	23
r. 9.9	45.22	22	41.6	5	3.75	25	29.6	6	45.90	34	43.9	16	3.02	54	9.1	19
19.8	45.48	26	42.5	9	4.03	28	29.5	1	46.30	40	42.9	10	3.65	63	7.7	14
29.8	45.76	28	43.7	12	4.34	31	29.8	3	46.74	44	42.5	4	4.34	69	6.9	8
ay 9.8	46.06	30	45.1	14	4.67	33	30.6	8	47.20	46	42.7	2	5.07	73	6.8	1
19.8	46.37	31	46.8	17	5.02	35	31.9	13	47.68	48	43.4	7	5.82	75	7.3	5
29.7	46.69	32	48.7	19	5.37	35	33.6	17	48.16	48	44.7	13	6.56	74	8.3	10
ne 8.7	47.01	32	50.8	21	5.72	35	35.7	21	48.63	47	46.6	19	7.28	72	9.9	16
18.7	47.32	31	52.9	21	6.05	33	38.1	24	49.08	45	48.9	23	7.96	68	12.0	21
28.7	47.61	29	55.1	22	6.36	31	40.7	26	49.49	41	51.6	27	8.57	61	14.6	26
ly 8.6	47.88	27	57.2	21	6.64	28	43.5	28	49.85	36	54.7	31	9.10	53	17.6	30
18.6	48.12	24	59.2	20	6.89	25	46.5	30	50.16	31	58.0	33	9.54	44	20.8	32
28.6	48.32	20	61.2	20	7.09	20	49.5	30	50.41	25	61.5	35	9.88	34	24.4	36
g. 7.5	48.49	17	63.0	18	7.25	16	52.5	30	50.58	17	65.1	36	10.11	23	28.1	37
17.5	48.61	12	64.6	16	7.36	11	55.4	29	50.69	11	68.8	37	10.22	11	31.9	38
27.5	48.68	7	66.0	14	7.42	6	58.2	28	50.73	4	72.4	36	10.22	0	35.7	38
pt. 6.5	48.72	4	67.1	11	7.43	1	60.8	26	50.70	3	75.8	34	10.11	11	39.4	37
16.4	48.71	1	68.1	10	7.40	3	63.1	23	50.60	10	79.1	33	9.90	21	42.9	35
26.4	48.67	4	68.8	7	7.33	7	65.2	21	50.45	15	82.1	30	9.58	32	46.2	33
t. 6.4	48.60	7	69.3	5	7.23	10	66.9	17	50.24	21	84.8	27	9.17	41	49.3	31
16.4	48.50	10	69.5	2	7.10	13	68.3	14	49.99	25	87.1	23	8.69	48	52.0	27
26.3	48.39	11	69.6	1	6.95	15	69.4	11	49.70	29	89.0	19	8.13	56	54.2	22
v. 5.3	48.27	12	69.5	1	6.78	17	70.0	6	49.39	31	90.4	14	7.53	60	56.0	18
15.3	48.14	13	69.1	4	6.61	17	70.3	3	49.06	33	91.3	9	6.90	63	57.2	12
25.2	48.02	12	68.6	5	6.44	17	70.1	2	48.73	33	91.6	3	6.24	66	57.8	6
c. 5.2	47.91	11	68.0	6	6.28	16	69.5	6	48.40	33	91.4	2	5.59	65	57.8	0
15.2	47.82	9	67.2	8	6.13	15	68.5	10	48.09	31	90.6	8	4.96	63	57.3	5
25.2	47.74	8	66.3	9	6.00	13	67.2	13	47.80	29	89.2	14	4.37	59	56.2	11
35.1	47.68	6	65.4	9	5.90	10	65.6	16	47.54	26	87.4	18	3.83	54	54.4	18
δ, Tan δ	1.005		+0.101		1.189		+0.643		1.875		+1.586		3.220		+3.061	
n Place	45ˢ.672		52″.60		4ˢ.683		45″.83		47ˢ.975		62″.13		7ˢ.096		27″.07	
α, Dω α	0.00		−0.01		−0.01		−0.04		−0.02		−0.09		−0.04		−0.18	
, Dω δ	+0.3		−0.5		+0.3		−0.5		+0.4		−0.5		+0.4		−0.5	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	θ Aquarii. Mag. 4.3				α Tucanæ. Mag. 2.9				γ Aquarii. Mag. 4.0				31 Pegasi. Mag. 4.9			
	Right Ascension.		Declination S.		Right Ascension.		Declination S.		Right Ascension.		Declination S.		Right Ascension.		Decli tio	
	h m 22 12		° ' − 8 13		h m 22 12		° ' −60 41		h m 22 17		° ' − 1 49		h m 22 17		° +11	
	s		"		s		"		s		"		s		"	
Jan. 1.1	10.26		28.2		27.39		75.4		5.48		59.5		9.88		37.2	
		4		4		16		19		5		7		6		
11.1	10.22		28.6		27.23		73.5		5.43		60.2		9.82		36.1	
		2		4		10		24		2		6		3		
21.1	10.20		29.0		27.13		71.1		5.41		60.8		9.79		34.8	
		1		2		4		26		0		6		1		
31.1	10.21		29.2		27.09		68.5		5.41		61.4		9.78		33.5	
		4		1		3		29		3		4		2		
Feb. 10.0	10.25		29.3		27.12		65.6		5.44		61.8		9.80		32.3	
		6		1		10		30		6		3		5		
20.0	10.31		29.2		27.22		62.6		5.50		62.1		9.85		31.2	
		10		3		16		31		9		1		9		
Mar. 1.0	10.41		28.9		27.38		59.5		5.59		62.2		9.94		30.3	
		13		5		22		32		12		1		12		
11.0	10.54		28.4		27.60		56.3		5.71		62.1		10.06		29.6	
		17		7		28		31		16		4		15		
20.9	10.71		27.7		27.88		53.2		5.87		61.7		10.21		29.2	
		19		10		34		31		19		6		19		
30.9	10.90		26.7		28.22		50.1		6.06		61.1		10.40		29.1	
		23		12		40		29		22		9		21		
Apr. 9.9	11.13		25.5		28.62		47.2		6.28		60.2		10.61		29.4	
		25		14		45		27		25		11		25		
19.8	11.38		24.1		29.07		44.5		6.53		59.1		10.86		30.0	
		28		15		49		24		27		14		28		
29.8	11.66		22.6		29.56		42.1		6.80		57.7		11.14		30.9	
		30		17		53		21		30		16		30		
May 9.8	11.96		20.9		30.09		40.0		7.10		56.1		11.44		32.2	
		32		19		55		18		31		18		31		
19.8	12.28		19.0		30.64		38.2		7.41		54.3		11.75		33.8	
		32		19		57		13		32		19		33		
29.7	12.60		17.1		31.21		36.9		7.73		52.4		12.08		35.7	
		33		19		57		9		32		20		32		
June 8.7	12.93		15.2		31.78		36.0		8.05		50.4		12.40		37.7	
		32		19		55		5		31		20		31		22
18.7	13.25		13.3		32.33		35.5		8.36		48.4		12.71		39.9	
		30		17		53		0		30		20		30		23
28.7	13.55		11.6		32.86		35.5		8.66		46.4		13.01		42.2	
		28		16		50		5		28		19		28		24
July 8.6	13.83		10.0		33.36		36.0		8.94		44.5		13.29		44.6	
		25		15		44		9		25		17		24		23
18.6	14.08		8.5		33.80		36.9		9.19		42.8		13.53		46.9	
		21		13		37		14		22		16		21		22
28.6	14.29		7.2		34.17		38.3		9.41		41.2		13.74		49.1	
		18		10		31		17		18		14		17		21
Aug. 7.5	14.47		6.2		34.48		40.0		9.59		39.8		13.91		51.2	
		13		8		22		20		13		12		13		19
17.5	14.60		5.4		34.70		42.0		9.72		38.6		14.04		53.1	
		9		6		14		22		9		10		8		18
27.5	14.69		4.8		34.84		44.2		9.81		37.6		14.12		54.9	
		5		4		5		23		5		8		4		15
Sept. 6.5	14.74		4.4		34.89		46.5		9.86		36.8		14.16		56.4	
		0		1		4		24		0		5		0		13
16.4	14.74		4.3		34.85		48.9		9.86		36.3		14.16		57.7	
		3		0		11		24		3		3		3		11
26.4	14.71		4.3		34.74		51.3		9.83		36.0		14.13		58.8	
		7		2		19		22		6		1		7		
Oct. 6.4	14.64		4.5		34.55		53.5		9.77		35.9		14.06		59.6	
		9		3		24		19		8		1		9		
16.4	14.55		4.8		34.31		55.4		9.69		36.0		13.97		60.1	
		10		5		29		16		10		2		11		
26.3	14.45		5.3		34.02		57.0		9.59		36.2		13.86		60.4	
		12		5		32		13		12		3		12		
Nov. 5.3	14.33		5.8		33.70		58.3		9.47		36.5		13.74		60.5	
		12		5		33		8		12		5		12		
15.3	14.21		6.3		33.37		59.1		9.35		37.0		13.62		60.4	
		12		6		33		2		11		5		12		
25.2	14.09		6.9		33.04		59.3		9.24		37.5		13.50		60.0	
		11		6		32		3		11		6		12		
Dec. 5.2	13.98		7.5		32.72		59.0		9.13		38.1		13.38		59.4	
		9		5		28		7		10		6		11		
15.2	13.89		8.0		32.44		58.3		9.03		38.7		13.27		58.6	
		8		5		24		12		8		7		9		
25.2	13.81		8.5		32.20		57.1		8.95		39.4		13.18		57.6	
		5		5		20		17		6		7		7		
35.1	13.76		9.0		32.00		55.4		8.89		40.1		13.11		56.5	
Sec δ, Tan δ	1.010		−0.145		2.043		−1.782		1.001		−0.032		1.022		+0.20	
Mean Place	$11^{s}.459$		$18''.41$		$28^{s}.819$		$54''.31$		$6^{s}.690$		$51''.62$		$11^{s}.196$		$41''.14$	
$D'_{\psi}\alpha$, $D_{\omega}\alpha$	0.00		+0.01		+0.02		+0.11		0.00		0.00		0.00		−0.01	
$D_{\psi}\delta$, $D_{\omega}\delta$	+0.4		−0.5		+0.4		−0.5		+0.4		−0.4		+0.4		−0.4	

FOR THE UPPER TRANSIT AT WASHINGTON.

ar	**β Lacertæ.** Mag. 4.6				**π Aquarii.** Mag. 4.6				**σ Aquarii.** Mag. 4.9				**α Lacertæ.** Mag. 3.8			
	Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination N.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	22 20		+51 46		22 20		+ 0 55		22 25		−11 7		22 27		+49 49	
	s		″		s		″		s		″		s		″	
.2	3.69		83.0		45.76		42.7		58.39		53.1		37.82		53.7	
.1	3.50	19	81.0	20	45.71	5	41.9	8	58.34	5	53.4	3	37.64	18	51.9	18
.1	3.35	15	78.7	23	45.68	3	41.2	7	58.31	3	53.6	2	37.50	14	49.6	23
.1	3.24	11	76.1	26	45.68	0	40.5	7	58.31	0	53.6	0	37.39	11	47.1	25
.0	3.19	5	73.3	28	45.71	3	39.9	6	58.33	2	53.5	1	37.33	6	44.4	27
.0	3.19	0	70.4	29	45.76	5	39.4	5	58.39	6	53.2	3	37.33	0	41.7	27
.0	3.25	6	67.7	27	45.84	8	39.1	3	58.47	8	52.7	5	37.38	5	39.0	27
.0	3.37	12	65.1	26	45.96	12	39.1	0	58.59	12	52.0	7	37.49	11	36.5	25
.9	3.56	19	62.8	23	46.11	15	39.3	2	58.74	15	51.1	9	37.66	17	34.3	22
.9	3.80	24	60.9	19	46.29	18	39.8	5	58.92	18	50.0	11	37.88	22	32.4	19
.9	4.10	30	59.4	15	46.51	22	40.6	8	59.14	22	48.6	14	38.16	28	31.0	14
.9	4.44	34	58.5	9	46.76	25	41.6	10	59.38	24	47.1	15	38.49	33	30.0	10
.8	4.82	38	58.1	4	47.03	27	42.9	13	59.66	28	45.4	17	38.85	36	29.6	4
.8	5.23	41	58.3	2	47.32	29	44.5	16	59.96	30	43.6	18	39.25	40	29.8	2
.8	5.66	43	59.1	8	47.63	31	46.2	17	60.27	31	41.7	19	39.67	42	30.5	7
.7	6.10	44	60.4	13	47.95	32	48.1	19	60.60	33	39.8	19	40.09	42	31.8	13
.7	6.53	43	62.2	18	48.27	32	50.1	20	60.93	33	37.9	19	40.51	42	33.6	18
.7	6.94	41	64.4	22	48.59	32	52.2	21	61.25	32	36.0	19	40.91	40	35.8	22
.7	7.32	38	67.0	26	48.89	30	54.2	20	61.56	31	34.3	17	41.29	38	38.4	26
.6	7.66	34	70.0	30	49.17	28	56.2	20	61.85	29	32.7	16	41.64	35	41.3	29
.6	7.96	30	73.2	32	49.42	25	58.1	19	62.11	26	31.3	14	41.94	30	44.5	32
.6	8.21	25	76.6	34	49.63	21	59.8	17	62.34	23	30.1	12	42.19	25	47.8	33
.6	8.40	19	80.1	35	49.81	18	61.4	16	62.53	19	29.2	9	42.39	20	51.2	34
.5	8.53	13	83.6	35	49.95	14	62.8	14	62.68	15	28.5	7	42.53	14	54.6	34
.5	8.60	7	87.0	34	50.04	9	63.9	11	62.78	10	28.1	4	42.61	8	58.0	34
.5	8.61	1	90.3	33	50.09	5	64.8	9	62.84	6	27.9	2	42.63	2	61.3	33
.4	8.56	5	93.5	32	50.10	1	65.5	7	62.86	2	27.9	0	42.60	3	64.4	31
.4	8.45	11	96.4	29	50.07	3	66.0	5	62.84	2	28.1	2	42.52	8	67.3	29
.4	8.30	15	99.0	26	50.01	6	66.2	2	62.78	6	28.4	3	42.39	13	69.9	26
.4	8.11	19	101.2	22	49.93	8	66.3	1	62.70	8	28.9	5	42.23	16	72.1	22
.3	7.89	22	103.0	18	49.83	10	66.2	1	62.60	10	29.5	6	42.03	20	73.9	18
.3	7.65	24	104.4	14	49.72	11	65.9	3	62.49	11	30.1	6	41.81	22	75.3	14
.3	7.39	26	105.3	9	49.60	12	65.5	4	62.37	12	30.7	6	41.57	24	76.2	9
.3	7.12	27	105.6	3	49.49	11	65.0	5	62.25	12	31.3	6	41.32	25	76.6	4
.2	6.86	26	105.5	1	49.38	11	64.4	6	62.14	11	31.9	6	41.08	24	76.5	1
.2	6.60	26	104.8	7	49.28	10	63.7	7	62.04	10	32.4	5	40.84	24	75.9	6
.2	6.37	23	103.6	12	49.20	8	63.0	7	61.96	8	32.9	5	40.62	22	74.8	11
.1	6.16	21	101.9	17	49.13	7	62.2	8	61.90	6	33.2	3	40.42	20	73.2	16
1 δ	1.617		+1.270		1.000		+0.016		1.019		−0.197		1.550		+1.185	
ce	$5^{s}.858$		76″.43		$46^{s}.972$		49″.70		$59^{s}.505$		42″.68		$39^{s}.860$		47″.14	
a	−0.01		−0.08		0.00		0.00		0.00		+0.01		−0.01		−0.07	
ʃ	+0.4		−0.4		+0.4		−0.4		+0.4		−0.4		+0.4		−0.4	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	υ Aquarii. Mag. 5.3				226 B. Cephei. Mag. 5.7				η Aquarii. Mag. 4.1				10 Lacertæ. Mag. 4.9			
	Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination N.	
	h m 22 29		° ′ −21 9		h m 22 30		° ′ +75 46		h m 22 30		° ′ − 0 34		h m 22 35		° +38	
	s		″		s		″		s		″		s		″	
Jan. 1.2	51.82		47.1		39.00		33.2		48.94		24.0		17.01		35.4	
11.1	51.76	6	47.0	1	38.30	70	31.5	17	48.88	6	24.7	7	16.88	13	33.7	
21.1	51.73	3	46.7	3	37.70	60	29.3	22	48.85	3	25.3	6	16.78	10	31.7	
31.1	51.72	1	46.2	5	37.22	48	26.7	26	48.84	1	25.9	6	16.71	7	29.5	
Feb. 10.1	51.74	2	45.4	8	36.88	34	23.7	30	48.85	1	26.4	5	16.67	4	27.2	
20.0	51.80	6	44.5	9	36.70	18	20.6	31	48.90	5	26.8	4	16.68	1	24.9	
Mar. 1.0	51.88	8	43.4	11	36.68	2	17.5	31	48.97	7	27.0	2	16.73	5	22.7	
11.0	52.00	12	42.1	13	36.83	15	14.4	31	49.08	11	26.9	1	16.83	10	20.6	
20.9	52.15	15	40.6	15	37.14	31	11.5	29	49.22	14	26.6	3	16.97	14	18.8	
30.9	52.34	19	39.0	16	37.60	46	8.9	26	49.40	18	26.0	6	17.16	19	17.3	
Apr. 9.9	52.56	22	37.2	18	38.20	60	6.7	22	49.61	21	25.2	8	17.40	24	16.3	
19.9	52.82	26	35.3	19	38.92	72	5.0	17	49.85	24	24.1	11	17.68	28	15.7	6
29.8	53.10	28	33.3	20	39.73	81	3.9	11	50.11	26	22.7	14	17.99	31	15.6	1
May 9.8	53.41	31	31.3	20	40.61	88	3.4	5	50.40	29	21.1	16	18.33	34	16.1	5
19.8	53.74	33	29.3	20	41.52	91	3.4	0	50.71	31	19.3	18	18.69	36	17.0	9
29.8	54.08	34	27.3	20	42.45	93	4.1	7	51.03	32	17.4	19	19.06	37	18.4	14
June 8.7	54.42	34	25.5	18	43.36	91	5.4	13	51.35	32	15.4	20	19.43	37	20.3	19
18.7	54.76	34	23.8	17	44.22	86	7.2	18	51.67	32	13.4	20	19.79	36	22.5	22
28.7	55.08	32	22.4	14	45.02	80	9.5	23	51.97	30	11.4	20	20.13	34	25.0	25
July 8.6	55.39	31	21.2	12	45.72	70	12.2	27	52.26	29	9.4	20	20.45	32	27.8	28
18.6	55.67	28	20.2	10	46.32	60	15.3	31	52.52	26	7.6	18	20.73	28	30.8	30
28.6	55.91	24	19.5	7	46.80	48	18.7	34	52.74	22	5.9	17	20.97	24	33.9	31
Aug. 7.6	56.12	21	19.1	4	47.15	35	22.3	36	52.93	19	4.4	15	21.16	19	37.0	31
17.5	56.28	16	19.0	1	47.37	22	26.1	38	53.08	15	3.1	13	21.31	15	40.1	31
27.5	56.39	11	19.2	2	47.45	8	29.9	38	53.18	10	2.0	11	21.40	9	43.1	30
Sept. 6.5	56.46	7	19.6	4	47.39	6	33.7	38	53.24	6	1.2	8	21.45	5	46.0	29
16.4	56.48	2	20.2	6	47.19	20	37.4	37	53.26	2	0.6	6	21.45	0	48.7	27
26.4	56.46	2	20.9	7	46.87	32	40.9	35	53.24	2	0.2	4	21.40	5	51.2	25
Oct. 6.4	56.41	5	21.8	9	46.43	44	44.2	33	53.19	5	0.0	2	21.32	8	53.4	22
16.4	56.33	8	22.7	9	45.88	55	47.2	30	53.12	7	0.0	0	21.20	12	55.2	18
26.3	56.22	11	23.6	9	45.23	65	49.8	26	53.03	9	0.1	1	21.06	14	56.7	15
Nov. 5.3	56.10	12	24.5	9	44.51	72	52.0	22	52.92	11	0.4	3	20.90	16	57.8	11
15.3	55.97	13	25.3	8	43.72	79	53.6	16	52.81	11	0.9	5	20.73	17	58.4	6
25.3	55.84	13	26.0	7	42.90	82	54.6	10	52.69	12	1.4	5	20.55	18	58.6	2
Dec. 5.2	55.72	12	26.5	5	42.06	84	55.1	5	52.58	11	2.0	6	20.37	18	58.4	2
15.2	55.61	11	26.9	4	41.23	83	55.0	1	52.48	10	2.7	7	20.20	17	57.8	6
25.2	55.52	9	27.1	2	40.43	80	54.2	8	52.40	8	3.4	7	20.04	16	56.7	11
35.1	55.45	7	27.1	0	39.69	74	52.9	13	52.33	7	4.1	7	19.90	14	55.2	15
Sec δ, Tan δ	1.072		−0.387		4.069		+3.945		1.000		−0.010		1.280		+0.798	
Mean Place	52ˢ.874		33″.92		43ˢ.907		22″.29		50ˢ.089		16″.79		18ˢ.659		31″.02	
D′ψ α, Dω α	0.00		+0.02		−0.04		−0.24		0.00		0.00		−0.01		−0.05	
Dψ δ, Dω δ	+0.4		−0.4		+0.4		−0.4		+0.4		−0.4		+0.4		−0.4	

APPARENT PLACES OF STARS, 1912.

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	ε **Piscis Australis.** Mag. 4.2				ζ **Pegasi.** Mag. 3.6				β **Octantis.** Mag. 4.3				β **Gruis.** Mag. 2.2			
	Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination S.	
	h m 22 35 s		° ′ −27 29 ″		h m 22 37 s		° ′ +10 22 ″		h m 22 37 s		° ′ −81 50 ″		h m 22 37 s		° ′ −47 20 ″	
Jan. 1.2	46.42		85.8		3.16		14.4		4.99		59.2		24.06		62.0	
11.1	46.36	6	85.5	3	3.09	7	13.3	11	4.04	95	56.7	25	23.94	12	60.8	12
21.1	46.32	4	84.9	6	3.05	4	12.2	11	3.29	75	53.8	29	23.86	8	59.2	16
31.1	46.30	2	84.0	9	3.03	2	11.1	11	2.76	53	50.5	33	23.82	4	57.3	19
Feb. 10.1	46.31	1	82.9	11	3.03	0	10.0	11	2.46	30	47.0	35	23.82	0	55.1	22
20.0	46.36	5	81.6	13	3.06	3	9.0	10	2.41	5	43.3	37	23.87	5	52.7	24
Mar. 1.0	46.44	8	80.1	15	3.12	6	8.2	8	2.59	18	39.5	38	23.96	9	50.1	26
11.0	46.56	12	78.4	17	3.22	10	7.6	6	3.01	42	35.7	38	24.09	13	47.4	27
20.9	46.71	15	76.5	19	3.36	14	7.3	3	3.65	64	32.0	37	24.27	18	44.6	28
30.9	46.90	19	74.6	19	3.53	17	7.2	1	4.51	86	28.4	36	24.50	23	41.8	28
Apr. 9.9	47.12	22	72.5	21	3.73	20	7.5	3	5.57	106	25.1	33	24.78	28	39.0	28
19.9	47.38	26	70.3	22	3.97	24	8.2	7	6.80	123	22.1	30	25.09	31	36.2	28
29.8	47.67	29	68.1	22	4.23	26	9.1	9	8.18	138	19.4	27	25.44	35	33.7	25
May 9.8	47.99	32	66.0	21	4.52	29	10.4	13	9.68	150	17.2	22	25.83	39	31.3	24
19.8	48.33	34	63.9	21	4.83	31	12.0	16	11.28	160	15.4	18	26.24	41	29.2	21
29.8	48.68	35	61.9	20	5.15	32	13.8	18	12.93	165	14.1	13	26.67	43	27.3	19
June 8.7	49.03	35	60.1	18	5.47	32	15.8	20	14.61	168	13.3	8	27.11	44	25.8	15
18.7	49.38	35	58.5	16	5.79	32	18.0	22	16.27	166	13.1	2	27.54	43	24.7	11
28.7	49.73	35	57.2	13	6.10	31	20.3	23	17.87	160	13.5	4	27.96	42	24.0	7
July 8.6	50.05	32	56.2	10	6.38	28	22.6	23	19.37	150	14.4	9	28.36	40	23.7	3
18.6	50.34	29	55.5	7	6.64	26	24.8	22	20.73	136	15.7	13	28.72	36	23.9	2
28.6	50.60	26	55.1	4	6.87	23	27.0	22	21.91	118	17.5	18	29.04	32	24.4	5
Aug. 7.6	50.82	22	55.0	1	7.06	19	29.0	20	22.87	96	19.8	23	29.31	27	25.3	9
17.5	50.99	17	55.3	3	7.21	15	30.9	19	23.58	71	22.3	25	29.52	21	26.6	13
27.5	51.11	12	55.8	5	7.31	10	32.6	17	24.03	45	25.1	28	29.67	15	28.2	16
Sept. 6.5	51.19	8	56.5	7	7.37	6	34.1	15	24.19	16	28.0	29	29.76	9	30.0	18
16.5	51.22	3	57.5	10	7.39	2	35.3	12	24.07	12	30.9	29	29.78	2	31.9	19
26.4	51.20	2	58.6	11	7.38	1	36.3	10	23.67	40	33.8	29	29.74	4	33.9	20
Oct. 6.4	51.15	5	59.7	11	7.34	4	37.1	8	23.01	66	36.4	26	29.66	8	35.9	20
16.4	51.06	9	60.9	12	7.27	7	37.7	6	22.12	89	38.7	23	29.53	13	37.8	19
26.3	50.95	11	62.1	12	7.17	10	38.0	3	21.03	109	40.6	19	29.36	17	39.4	16
Nov. 5.3	50.82	13	63.2	11	7.06	11	38.0	0	19.78	125	42.0	14	29.17	19	40.8	14
15.3	50.68	14	64.1	9	6.95	11	37.9	1	18.43	135	42.9	9	28.96	21	41.9	11
25.3	50.54	14	64.8	7	6.83	12	37.5	4	17.03	140	43.1	2	28.75	21	42.6	7
Dec. 5.2	50.41	13	65.3	5	6.72	11	37.0	5	15.64	139	42.7	4	28.55	20	42.9	3
15.2	50.29	12	65.6	3	6.61	11	36.3	7	14.31	133	41.7	10	28.36	19	42.7	2
25.2	50.19	10	65.6	0	6.52	9	35.4	9	13.09	122	40.1	16	28.19	17	42.2	5
35.2	50.11	8	65.4	2	6.44	8	34.4	10	12.02	107	37.9	22	28.05	14	41.2	10
Sec δ, Tan δ	1.127		−0.521		1.017		+0.183		7.048		−6.977		1.476		−1.085	
Mean Place	$47^{s}.432$		$71''.01$		$4^{s}.368$		$17''.98$		$7^{s}.388$		$36''.14$		$25^{s}.059$		$42''.65$	
D′ψ α, Dω α	0.00		+0.03		0.00		−0.01		+0.07		+0.44		+0.01		+0.07	
Dψ δ, Dω δ	+0.4		−0.4		+0.4		−0.4		+0.4		−0.4		+0.4		−0.4	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	η Pegasi. Mag. 3.1				λ Pegasi. Mag. 4.1				ε Gruis. Mag. 3.7				τ Aquarii. Mag. 4.2			
	Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination S.	
	h m 22 38		° ′ +29 45		h m 22 42		° ′ +23 5		h m 22 43		° ′ −51 46		h m 22 44		° −14	
	s		″		s		″		s		″		s		″	
Jan. 1.2	51.07		40.4		16.12		68.7		13.68		67.4		55.06		37.1	
11.1	50.97	10	38.9	15	16.03	9	67.3	14	13.54	14	66.0	14	55.00	6	37.3	
21.1	50.89	8	37.2	17	15.96	7	65.8	15	13.44	10	64.3	17	54.96	4	37.3	
31.1	50.83	6	35.3	19	15.92	4	64.2	16	13.38	6	62.2	21	54.94	2	37.2	
Feb. 10.1	50.81	2	33.3	20	15.90	2	62.5	17	13.36	2	59.8	24	54.94	0	36.9	
20.0	50.83	2	31.3	20	15.92	2	60.8	17	13.39	3	57.2	26	54.98	4	36.5	
Mar. 1.0	50.88	5	29.4	19	15.97	5	59.3	15	13.47	8	54.4	28	55.04	6	35.8	
11.0	50.97	9	27.8	16	16.06	9	58.0	13	13.61	14	51.4	30	55.14	10	34.8	
20.9	51.10	13	26.4	14	16.19	13	57.0	10	13.79	18	48.4	30	55.28	14	33.7	
30.9	51.28	18	25.3	11	16.36	17	56.3	7	14.02	23	45.4	30	55.44	16	32.4	
Apr. 9.9	51.50	22	24.6	7	16.57	21	56.0	3	14.31	29	42.4	30	55.64	20	30.9	
19.9	51.76	26	24.4	2	16.81	24	56.0	0	14.64	33	39.6	28	55.88	24	29.2	
29.8	52.05	29	24.7	3	17.09	28	56.5	5	15.01	37	36.9	27	56.14	26	27.3	
May 9.8	52.36	31	25.4	7	17.39	30	57.3	8	15.42	41	34.4	25	56.43	29	25.4	
19.8	52.69	33	26.5	11	17.71	32	58.6	13	15.86	44	32.2	22	56.74	31	23.4	
29.8	53.04	35	28.0	15	18.04	33	60.3	17	16.32	46	30.4	18	57.07	33	21.4	
June 8.7	53.39	35	30.0	20	18.38	34	62.2	19	16.78	46	29.0	14	57.40	33	19.4	20
18.7	53.73	34	32.2	22	18.71	33	64.4	22	17.25	47	27.9	11	57.74	34	17.5	19
28.7	54.06	33	34.7	25	19.03	32	66.8	24	17.70	45	27.3	6	58.06	32	15.8	17
July 8.6	54.36	30	37.3	26	19.32	29	69.3	25	18.13	43	27.1	2	58.36	30	14.2	16
18.6	54.63	27	40.1	28	19.59	27	71.9	26	18.52	39	27.3	2	58.64	28	12.9	13
28.6	54.86	23	43.0	29	19.82	23	74.6	27	18.87	35	28.0	7	58.88	24	11.8	11
Aug. 7.6	55.05	19	45.8	28	20.02	20	77.2	26	19.16	29	29.1	11	59.09	21	11.0	8
17.5	55.20	15	48.6	28	20.17	15	79.7	25	19.39	23	30.6	15	59.26	17	10.4	6
27.5	55.30	10	51.3	27	20.27	10	82.1	24	19.56	17	32.3	17	59.38	12	10.1	3
Sept. 6.5	55.36	6	53.8	25	20.34	7	84.3	22	19.66	10	34.3	20	59.46	8	10.1	0
16.5	55.37	1	56.1	23	20.36	2	86.3	20	19.69	3	36.4	21	59.50	4	10.2	1
26.4	55.34	3	58.2	21	20.34	2	88.0	17	19.66	3	38.6	22	59.49	1	10.6	4
Oct. 6.4	55.28	6	60.0	18	20.29	5	89.4	14	19.56	10	40.8	22	59.45	4	11.2	6
16.4	55.19	9	61.4	14	20.21	8	90.6	12	19.41	15	42.8	20	59.39	6	11.8	6
26.3	55.07	12	62.5	11	20.11	10	91.4	8	19.22	19	44.6	18	59.30	9	12.5	7
Nov. 5.3	54.94	13	63.3	8	19.99	12	92.0	6	19.01	21	46.1	15	59.19	11	13.3	8
15.3	54.79	15	63.7	4	19.86	13	92.2	2	18.78	23	47.2	11	59.08	11	14.0	7
25.3	54.64	15	63.8	1	19.73	13	92.2	0	18.54	24	47.9	7	58.96	12	14.7	7
Dec. 5.2	54.49	15	63.5	3	19.60	13	91.8	4	18.31	23	48.2	3	58.85	11	15.3	6
15.2	54.35	14	62.8	7	19.47	13	91.1	7	18.09	22	48.1	1	58.74	11	15.8	5
25.2	54.22	13	61.7	11	19.36	11	90.1	10	17.89	20	47.4	7	58.65	9	16.2	4
35.2	54.11	11	60.4	13	19.26	10	88.9	12	17.72	17	46.3	11	58.58	7	16.5	3
Sec δ, Tan δ	1.152		+0.572		1.087		+0.426		1.616		−1.270		1.031		−0.250	
Mean Place	$52^{s}.520$		38″.21		$17^{s}.448$		68″.28		$14^{s}.643$		47″.16		$56^{s}.061$		26″.17	
D′ψ α, Dω α	−0.01		−0.04		0.00		−0.03		+0.01		+0.08		0.00		+0.02	
Dψ δ, Dω δ	+0.4		−0.3		+0.4		−0.3		+0.4		−0.3		+0.4		−0.3	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	*μ* Pegasi. Mag. 3.7				*ι* Cephei. Mag. 3.7				*λ* Aquarii. Mag. 3.8				*ρ* Indi. Mag. 6.1			
	Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination S.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	22 45		+24 7		22 46		+65 43		22 48		− 8 2		22 48		−70 32	
	s		″		s		″		s		″		s		″	
Jan. 1.2	43.96		72.9		29.75		85.2		0.45		62.3		31.76		61.4	
11.1	43.86	10	71.6	13	29.37	38	83.6	16	0.38	7	62.7	4	31.40	36	59.4	20
21.1	43.79	7	70.0	16	29.04	33	81.5	21	0.34	4	63.0	3	31.11	29	57.0	24
31.1	43.74	5	68.3	17	28.77	27	79.0	25	0.32	2	63.2	2	30.90	21	54.1	29
Feb. 10.1	43.72	2	66.6	17	28.58	19	76.2	28	0.32	0	63.2	0	30.79	11	50.9	32
20.0	43.73	1	64.9	17	28.47	11	73.2	30	0.35	3	63.1	1	30.77	2	47.5	34
Mar. 1.0	43.78	5	63.4	15	28.46	1	70.2	30	0.41	6	62.8	3	30.85	8	44.0	35
11.0	43.87	9	62.0	14	28.55	9	67.2	30	0.50	9	62.3	5	31.03	18	40.4	36
21.0	44.00	13	60.9	11	28.73	18	64.4	28	0.63	13	61.5	8	31.30	27	36.8	36
30.9	44.16	16	60.1	8	29.00	27	61.9	25	0.79	16	60.5	10	31.67	37	33.3	35
Apr. 9.9	44.37	21	59.7	4	29.36	36	59.9	20	0.98	19	59.2	13	32.12	45	29.9	34
19.9	44.61	24	59.7	0	29.80	44	58.3	16	1.21	23	57.8	14	32.66	54	26.8	31
29.8	44.89	28	60.1	4	30.30	50	57.2	11	1.47	26	56.1	17	33.27	61	23.9	29
May 9.8	45.19	30	61.0	9	30.85	55	56.8	4	1.76	29	54.3	18	33.94	67	21.4	25
19.8	45.51	32	62.2	12	31.44	59	56.9	1	2.06	30	52.4	19	34.66	72	19.3	21
29.8	45.84	33	63.8	16	32.04	60	57.6	7	2.38	32	50.4	20	35.42	76	17.6	17
June 8.7	46.18	34	65.7	19	32.64	60	58.8	12	2.71	33	48.4	20	36.19	77	16.5	11
18.7	46.52	34	67.9	22	33.22	58	60.6	18	3.03	32	46.4	20	36.96	77	15.8	7
28.7	46.84	32	70.3	24	33.76	54	62.9	23	3.35	32	44.5	19	37.71	75	15.7	1
July 8.7	47.14	30	72.8	25	34.26	50	65.6	27	3.65	30	42.8	17	38.42	71	16.1	4
18.6	47.41	27	75.5	27	34.70	44	68.7	31	3.92	27	41.2	16	39.07	65	17.0	9
28.6	47.65	24	78.2	27	35.07	37	72.0	33	4.16	24	39.8	14	39.65	58	18.4	14
Aug. 7.6	47.85	20	80.8	26	35.36	29	75.6	36	4.37	21	38.6	12	40.14	49	20.2	18
17.5	48.00	15	83.3	25	35.57	21	79.3	37	4.53	16	37.7	9	40.52	38	22.3	21
27.5	48.11	11	85.7	24	35.69	12	83.0	37	4.65	12	37.1	6	40.78	26	24.7	24
Sept. 6.5	48.17	6	88.0	23	35.73	4	86.7	37	4.73	8	36.7	4	40.92	14	27.4	27
16.5	48.19	2	90.0	20	35.68	5	90.3	36	4.77	4	36.5	2	40.93	1	30.2	28
26.4	48.18	1	91.8	18	35.56	12	93.7	34	4.77	0	36.5	0	40.83	10	32.9	27
Oct. 6.4	48.14	4	93.3	15	35.36	20	96.9	32	4.74	3	36.7	2	40.62	21	35.5	26
16.4	48.06	8	94.6	13	35.10	26	99.8	29	4.68	6	37.1	4	40.30	32	37.9	24
26.4	47.96	10	95.5	9	34.77	33	102.3	25	4.59	9	37.6	5	39.89	41	40.0	21
Nov. 5.3	47.84	12	96.1	6	34.40	37	104.4	21	4.49	10	38.1	5	39.42	47	41.6	16
15.3	47.71	13	96.4	3	34.00	40	106.0	16	4.38	11	38.7	6	38.91	51	42.7	11
25.3	47.58	13	96.4	0	33.57	43	107.0	10	4.27	11	39.4	7	38.38	53	43.3	6
Dec. 5.2	47.44	14	96.0	4	33.12	45	107.5	5	4.16	11	40.0	6	37.85	53	43.3	0
15.2	47.32	12	95.3	7	32.68	44	107.4	1	4.06	10	40.6	6	37.34	51	42.7	6
25.2	47.20	12	94.4	9	32.25	43	106.6	8	3.97	9	41.1	5	36.87	47	41.5	12
35.2	47.10	10	93.2	12	31.84	41	105.3	13	3.90	7	41.6	5	36.45	42	39.8	17
Sec *δ*, Tan *δ*	1.096		+0.448		2.434		+2.219		1.010		−0.141		3.002		−2.831	
Mean Place	$45^{s}.283$		$72''.00$		$32^{s}.669$		$74''.47$		$1^{s}.458$		$53''.22$		$32^{s}.870$		$38''.72$	
$D'_{\psi}\alpha$, $D_{\omega}\alpha$	0.00		−0.03		−0.02		−0.14		0.00		+0.01		+0.02		+0.18	
$D_{\psi}\delta$, $D_{\omega}\delta$	+0.4		−0.3		+0.4		−0.3		+0.4		−0.3		+0.4		−0.3	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	δ Aquarii. Mag. 3.5				α Piscis Australis. Mag. 1.3				ο Andromedæ. Mag. 3.6				β Pegasi. Var. 2.2–2.7			
	Right Ascension.		Declination S.		Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination N.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	22 49		−16 17		22 52		−30 5		22 57		+41 50		22 59		+27 36	
	s		″		s		″		s		″		s		″	
Jan. 1.2	57.92		32.1		46.56		35.5		50.54		76.6		29.08		21.4	
11.1	57.85	7	32.2	1	46.48	8	35.1	4	50.38	16	75.1	15	28.97	11	20.0	14
21.1	57.80	5	32.1	1	46.42	6	34.4	7	50.25	13	73.2	19	28.88	9	18.5	15
31.1	57.78	2	31.9	2	46.39	3	33.4	10	50.15	10	71.1	21	28.81	7	16.8	17
Feb. 10.1	57.78	0	31.5	4	46.38	1	32.2	12	50.08	7	68.8	23	28.78	3	15.0	18
20.0	57.81	3	30.9	6	46.41	3	30.8	14	50.06	2	66.5	23	28.77	1	13.2	18
Mar. 1.0	57.87	6	30.0	9	46.47	6	29.1	17	50.08	2	64.1	24	28.80	3	11.5	17
11.0	57.96	9	29.0	10	46.57	10	27.2	19	50.15	7	61.9	22	28.88	8	9.9	16
21.0	58.09	13	27.7	13	46.70	13	25.2	20	50.27	12	59.9	20	28.99	11	8.6	13
30.9	58.26	17	26.3	14	46.88	18	23.0	22	50.44	17	58.3	16	29.14	15	7.6	10
Apr. 9.9	58.46	20	24.6	17	47.09	21	20.7	23	50.66	22	57.0	13	29.34	20	7.0	6
19.9	58.69	23	22.8	18	47.34	25	18.4	23	50.92	26	56.2	8	29.58	24	6.8	2
29.8	58.95	26	20.9	19	47.62	28	16.1	23	51.23	31	55.8	4	29.85	27	7.0	2
May 9.8	59.24	29	18.9	20	47.93	31	13.8	23	51.57	34	55.9	1	30.15	30	7.7	7
19.8	59.55	31	16.8	21	48.27	34	11.6	22	51.94	37	56.6	7	30.47	32	8.8	11
29.8	59.88	33	14.8	20	48.62	35	9.5	21	52.32	38	57.8	12	30.81	34	10.2	14
June 8.7	60.22	34	12.8	20	48.98	36	7.6	19	52.71	39	59.4	16	31.16	35	12.0	18
18.7	60.55	33	11.0	18	49.34	36	6.0	16	53.09	38	61.4	20	31.50	34	14.1	21
28.7	60.87	32	9.2	18	49.69	35	4.6	14	53.46	37	63.8	24	31.83	33	16.5	24
July 8.7	61.18	31	7.7	15	50.03	34	3.6	10	53.80	34	66.5	27	32.14	31	19.1	26
18.6	61.47	29	6.5	12	50.34	31	2.9	7	54.11	31	69.4	29	32.43	29	21.8	27
28.6	61.72	25	5.5	10	50.62	28	2.5	4	54.38	27	72.4	30	32.68	25	24.5	27
Aug. 7.6	61.93	21	4.7	8	50.85	23	2.5	0	54.60	22	75.6	32	32.89	21	27.3	28
17.5	62.10	17	4.3	4	51.04	19	2.8	3	54.78	18	78.8	32	33.06	17	30.0	27
27.5	62.23	13	4.1	2	51.19	15	3.4	6	54.91	13	81.9	31	33.19	13	32.6	26
Sept. 6.5	62.32	9	4.2	1	51.29	10	4.3	9	54.98	7	85.0	31	33.27	8	35.0	24
16.5	62.36	4	4.5	3	51.33	4	5.4	11	55.01	3	87.9	29	33.31	4	37.2	22
26.4	62.36	0	5.0	5	51.33	0	6.7	13	54.99	2	90.6	27	33.31	0	39.2	20
Oct. 6.4	62.33	3	5.6	6	51.29	4	8.0	13	54.93	6	93.0	24	33.27	4	41.0	18
16.4	62.26	7	6.4	8	51.21	8	9.4	14	54.83	10	95.1	21	33.20	7	42.4	14
26.4	62.17	9	7.2	8	51.11	10	10.7	13	54.70	13	96.8	17	33.11	9	43.6	12
Nov. 5.3	62.07	10	8.0	8	50.99	12	11.9	12	54.55	15	98.2	14	33.00	11	44.4	8
15.3	61.96	11	8.8	8	50.85	14	13.0	11	54.38	17	99.2	10	32.87	13	44.9	5
25.3	61.84	12	9.6	8	50.71	14	13.8	8	54.20	18	99.7	5	32.74	13	45.0	1
Dec. 5.2	61.72	12	10.2	6	50.58	13	14.4	6	54.01	19	99.8	1	32.60	14	44.8	2
15.2	61.61	11	10.7	5	50.45	13	14.7	3	53.83	18	99.4	4	32.46	14	44.3	5
25.2	61.52	9	11.1	4	50.33	12	14.7	0	53.65	18	98.5	9	32.34	12	43.4	9
35.2	61.44	8	11.3	2	50.24	9	14.5	2	53.48	17	97.2	13	32.22	12	42.2	12
Sec δ, Tan δ	1.042		−0.292		1.156		−0.579		1.343		+0.896		1.128		+0.523	
Mean Place	$58^s.875$		$20''.58$		$47^s.444$		$20''.09$		$52^s.143$		$70''.16$		$30^s.382$		$18''.78$	
$D'_\psi \alpha$, $D_\omega \alpha$	0.00		+0.02		0.00		+0.04		−0.01		−0.06		0.00		−0.03	
$D_\psi \delta$, $D_\omega \delta$	+0.4		−0.3		+0.4		−0.3		+0.4		−0.3		+0.4		−0.3	

an Solar Date.	α Pegasi. Mag. 2.6				55 Pegasi. Mag. 4.7				c^3 Aquarii. Mag. 3.8				π Cephei. Mag. 4.6			
	Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension		Declination S.		Right Ascension.		Declination N.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	23 0		+14 43		23 2		+ 8 55		23 4		−21 38		23 4		+74 54	
	s		″		s		″		s		″		s		″	
n. 1.2	21.44	9	52.4	11	33.18	8	58.7	9	44.53	8	74.1	1	61.59	70	55.0	12
11.2	21.35	7	51.3	12	33.10	7	57.8	10	44.45	6	74.0	2	60.89	63	53.8	19
21.1	21.28	4	50.1	13	33.03	4	56.8	10	44.39	4	73.8	5	60.26	54	51.9	23
31.1	21.24	2	48.8	12	32.99	2	55.8	9	44.35	2	73.3	8	59.72	42	49.6	27
b. 10.1	21.22	0	47.6	12	32.97	1	54.9	8	44.33	1	72.5	9	59.30	28	46.9	29
20.0	21.22	4	46.4	10	32.98	4	54.1	7	44.34	5	71.6	12	59.02	13	44.0	31
ar. 1.0	21.26	8	45.4	8	33.02	7	53.4	5	44.39	8	70.4	14	58.89	2	40.9	31
11.0	21.34	11	44.6	6	33.09	11	52.9	2	44.47	11	69.0	16	58.91	18	37.8	30
21.0	21.45	15	44.0	3	33.20	14	52.7	0	44.58	15	67.4	18	59.09	34	34.8	27
30.9	21.60	18	43.7	1	33.34	18	52.7	3	44.73	19	65.6	19	59.43	48	32.1	24
r. 9.9	21.78	22	43.8	4	33.52	22	53.0	7	44.92	23	63.7	21	59.91	60	29.7	20
19.9	22.00	26	44.2	7	33.74	25	53.7	10	45.15	26	61.6	21	60.51	71	27.7	15
29.9	22.26	28	44.9	11	33.99	28	54.7	13	45.41	29	59.5	22	61.22	80	26.2	9
y 9.8	22.54	30	46.0	14	34.27	30	56.0	16	45.70	31	57.3	22	62.02	85	25.3	3
19.8	22.84	32	47.4	17	34.57	32	57.6	18	46.01	33	55.1	22	62.87	89	25.0	3
29.8	23.16	33	49.1	20	34.89	32	59.4	19	46.34	34	52.9	20	63.76	89	25.3	8
ne 8.7	23.49	33	51.1	21	35.21	32	61.3	21	46.68	34	50.9	19	64.65	87	26.1	14
18.7	23.82	32	53.2	23	35.53	32	63.4	22	47.02	34	49.0	16	65.52	83	27.5	19
28.7	24.14	30	55.5	23	35.85	30	65.6	23	47.36	32	47.4	14	66.35	76	29.4	24
ly 8.7	24.44	27	57.8	24	36.15	27	67.9	22	47.68	30	46.0	12	67.11	68	31.8	28
18.6	24.71	24	60.2	23	36.42	25	70.1	21	47.98	27	44.8	8	67.79	58	34.6	32
28.6	24.95	21	62.5	23	36.67	21	72.2	20	48.25	23	44.0	5	68.37	47	37.8	34
g. 7.6	25.16	17	64.8	21	36.88	17	74.2	18	48.48	19	43.5	2	68.84	34	41.2	37
17.6	25.33	13	66.9	20	37.05	13	76.0	17	48.67	15	43.3	1	69.18	22	44.9	38
27.5	25.46	9	68.9	17	37.18	9	77.7	14	48.82	11	43.4	4	69.40	9	48.7	38
pt. 6.5	25.55	4	70.6	15	37.27	5	79.1	12	48.93	6	43.8	6	69.49	3	52.5	38
16.5	25.59	1	72.1	13	37.32	1	80.3	10	48.99	1	44.4	8	69.46	16	56.3	37
26.4	25.60	3	73.4	11	37.33	2	81.3	7	49.00	3	45.2	9	69.30	28	60.0	36
t. 6.4	25.57	5	74.5	8	37.31	5	82.0	5	48.97	5	46.1	10	69.02	39	63.6	33
16.4	25.52	8	75.3	5	37.26	8	82.5	3	48.92	8	47.1	11	68.63	49	66.9	29
26.4	25.44	10	75.8	3	37.18	9	82.8	1	48.84	11	48.2	11	68.14	58	69.8	25
v. 5.3	25.34	11	76.1	1	37.09	10	82.9	1	48.73	11	49.3	10	67.56	65	72.3	20
15.3	25.23	11	76.2	2	36.99	11	82.8	3	48.62	12	50.3	8	66.91	71	74.3	16
25.3	25.12	11	76.0	4	36.88	11	82.5	5	48.50	12	51.1	7	66.20	74	75.9	9
c. 5.3	25.01	11	75.6	6	36.77	10	82.0	6	48.38	12	51.8	5	65.46	77	76.8	3
15.2	24.90	11	75.0	9	36.67	10	81.4	8	48.26	10	52.3	3	64.69	75	77.1	3
25.2	24.79	9	74.1	10	36.57	9	80.6	9	48.16	10	52.6	1	63.94	73	76.8	8
35.2	24.70		73.1		36.48		79.7		48.06		52.7		63.21		76.0	
δ, Tan δ	1.034		+0.263		1.012		+0.157		1.076		−0.397		3.843		+3.710	
n Place	$22^{s}.571$		53″.74		$34^{s}.238$		61″.92		$45^{s}.366$		61″.20		$65^{s}.738$		41″.86	
α, $D_\omega \alpha$	0.00		−0.02		0.00		−0.01		+0.01		+0.03		−0.02		−0.24	
, $D_\omega \delta$	+0.4		−0.3		+0.4		−0.2		+0.4		−0.2		+0.4		−0.2	

Mean Solar Date.	ι Gruis. Mag. 4.1				59 Pegasi. Mag. 5.2				5 Cassiop. (*Heis*). Mag. 5.6				φ Aquarii. Mag. 4.4			
	Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination S.	
	h m		° ′		h m		° ′		h m		° ′		h m		°	
	23 5		−45 43		23 7		+ 8 14		23 8		+56 40		23 9		− 6	
	s		″		s		″		s		″		s		″	
Jan. 1.2	22.14		44.0		16.55		28.3		60.44		67.3		45.02		33.0	
11.2	22.01	13	43.0	10	16.47	8	27.4	9	60.18	26	65.9	14	44.94	8	33.4	
21.1	21.90	11	41.7	13	16.40	7	26.5	9	59.95	23	64.0	19	44.88	6	33.8	
31.1	21.83	7	40.0	17	16.36	4	25.5	10	59.76	19	61.8	22	44.84	4	34.1	
Feb. 10.1	21.79	4	38.0	20	16.34	2	24.6	9	59.62	14	59.2	26	44.82	2	34.2	
20.0	21.79	0	35.7	23	16.34	0	23.8	8	59.54	8	56.5	27	44.83	1	34.1	
Mar. 1.0	21.83	4	33.2	25	16.37	3	23.2	6	59.52	2	53.7	28	44.87	4	33.9	
11.0	21.92	9	30.5	27	16.44	7	22.8	4	59.57	5	51.0	27	44.94	7	33.4	
21.0	22.06	14	27.6	29	16.54	10	22.6	2	59.69	12	48.4	26	45.04	10	32.7	
30.9	22.24	18	24.7	29	16.68	14	22.7	1	59.89	20	46.1	23	45.18	14	31.8	
Apr. 9.9	22.47	23	21.8	29	16.86	18	23.0	3	60.15	26	44.2	19	45.35	17	30.6	12
19.9	22.74	27	18.9	29	17.08	22	23.7	7	60.48	33	42.8	14	45.56	21	29.2	14
29.9	23.06	32	16.1	28	17.32	24	24.8	11	60.87	39	41.8	10	45.81	25	27.6	16
May 9.8	23.41	35	13.5	26	17.60	28	26.1	13	61.30	43	41.4	4	46.08	27	25.8	18
19.8	23.79	38	11.1	24	17.90	30	27.6	15	61.76	46	41.5	1	46.38	30	23.9	19
29.8	24.20	41	9.0	21	18.21	31	29.4	18	62.24	48	42.2	7	46.69	31	21.9	20
June 8.7	24.62	42	7.2	18	18.53	32	31.4	20	62.74	50	43.4	12	47.01	32	19.8	21
18.7	25.04	42	5.7	15	18.86	33	33.5	21	63.22	48	45.1	17	47.34	33	17.8	20
28.7	25.46	42	4.7	10	19.18	32	35.7	22	63.69	47	47.3	22	47.66	32	15.8	20
July 8.7	25.86	40	4.1	6	19.48	30	37.9	22	64.13	44	49.9	26	47.96	30	14.0	18
18.6	26.24	38	3.9	2	19.75	27	40.1	22	64.52	39	52.8	29	48.25	29	12.3	17
28.6	26.57	33	4.1	2	20.00	25	42.2	21	64.86	34	56.0	32	48.51	26	10.8	15
Aug. 7.6	26.86	29	4.8	7	20.22	22	44.2	20	65.16	30	59.4	34	48.73	22	9.5	13
17.6	27.10	24	5.9	11	20.39	17	46.0	18	65.39	23	62.9	35	48.91	18	8.5	10
27.5	27.28	18	7.2	13	20.53	14	47.6	16	65.55	16	66.4	35	49.05	14	7.7	8
Sept. 6.5	27.40	12	8.9	17	20.62	9	49.0	14	65.65	10	70.0	36	49.15	10	7.2	5
16.5	27.46	6	10.8	19	20.68	6	50.2	12	65.69	4	73.4	34	49.21	6	6.9	3
26.4	27.46	0	12.8	20	20.69	1	51.1	9	65.66	3	76.7	33	49.23	2	6.8	1
Oct. 6.4	27.41	5	14.8	20	20.67	2	51.8	7	65.58	8	79.8	31	49.22	1	7.0	2
16.4	27.32	9	16.8	20	20.63	4	52.3	5	65.45	13	82.6	28	49.18	4	7.3	3
26.4	27.18	14	18.7	19	20.56	7	52.5	2	65.27	18	85.0	24	49.11	7	7.7	4
Nov. 5.3	27.01	17	20.3	16	20.47	9	52.6	1	65.06	21	87.0	20	49.02	9	8.2	5
15.3	26.83	18	21.6	13	20.37	10	52.4	2	64.81	25	88.6	16	48.92	10	8.8	6
25.3	26.64	19	22.6	10	20.26	11	52.1	3	64.54	27	89.7	11	48.82	10	9.5	7
Dec. 5.3	26.44	20	23.2	6	20.15	11	51.6	5	64.26	28	90.2	5	48.71	11	10.2	7
15.2	26.25	19	23.3	1	20.05	10	51.0	6	63.97	29	90.2	0	48.61	10	10.8	6
25.2	26.08	17	23.0	3	19.95	10	50.2	8	63.69	28	89.7	5	48.52	9	11.4	6
35.2	25.92	16	22.4	6	19.86	9	49.4	8	63.42	27	88.6	11	48.43	9	11.9	5
Sec δ, Tan δ	1.432		−1.026		1.010		+0.145		1.821		+1.521		1.006		−0.114	
Mean Place	22ˢ.886		24″.94		17ˢ.581		31″.55		62ˢ.504		56″.72		45ˢ.914		24″.93	
D′ψ α, Dω α	+0.01		+0.07		0.00		−0.01		−0.01		−0.10		0.00		+0.01	
Dψ δ, Dω δ	+0.4		−0.2		+0.4		−0.2		+0.4		−0.2		+0.4		−0.2	

FOR THE UPPER TRANSIT AT WASHINGTON.

ar	*ψ* **Aquarii.** Mag. 4.5				*γ* **Tucanæ.** Mag. 4.1				*γ* **Piscium.** Mag. 3.8				*γ* **Sculptoris.** Mag. 4.5			
	Right Ascension.		**Declination S.**		**Right Ascension.**		**Declination S.**		**Right Ascension.**		**Declination N.**		**Right Ascension.**		**Declination S.**	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	23 11		− 9 33		23 12		−58 42		23 12		+ 2 47		23 14		−33 0	
	s		″		s		″		s		″		s		″	
.2	16.07		70.9		17.32		88.6		35.23		59.9		3.74		57.7	
.2	15.99	8	71.3	4	17.09	23	87.2	14	35.15	8	59.1	8	3.64	10	57.3	4
.1	15.93	6	71.6	3	16.90	19	85.3	19	35.09	6	58.4	7	3.55	9	56.6	7
.1	15.89	4	71.7	1	16.76	14	83.1	22	35.04	5	57.7	7	3.49	6	55.5	11
.1	15.87	2	71.6	1	16.67	9	80.5	26	35.02	2	57.1	6	3.46	3	54.2	13
.1	15.88	1	71.4	2	16.63	4	77.6	29	35.02	0	56.6	5	3.46	0	52.6	16
.0	15.92	4	70.9	5	16.65	2	74.5	31	35.06	4	56.3	3	3.49	3	50.8	18
.0	15.99	7	70.3	6	16.73	8	71.3	32	35.12	6	56.2	1	3.56	7	48.7	21
.0	16.09	10	69.4	9	16.88	15	67.9	34	35.22	10	56.4	2	3.68	12	46.4	23
.9	16.23	14	68.2	12	17.09	21	64.5	34	35.36	14	56.8	4	3.83	15	44.0	24
.9	16.41	18	66.9	13	17.36	27	61.2	33	35.53	17	57.4	6	4.02	19	41.6	24
.9	16.62	21	65.3	16	17.69	33	58.0	32	35.74	21	58.4	10	4.25	23	39.1	25
.9	16.86	24	63.6	17	18.07	38	55.0	30	35.98	24	59.6	12	4.52	27	36.5	26
.8	17.14	28	61.7	19	18.51	44	52.2	28	36.26	28	61.1	15	4.82	30	34.0	25
.8	17.44	30	59.7	20	18.98	47	49.7	25	36.55	29	62.8	17	5.15	33	31.6	24
.8	17.75	31	57.7	20	19.48	50	47.6	21	36.86	31	64.7	19	5.50	35	29.4	22
.8	18.08	33	55.6	21	20.01	53	45.9	17	37.18	32	66.7	20	5.87	37	27.4	20
.7	18.41	33	53.6	20	20.54	53	44.7	12	37.51	33	68.8	21	6.24	37	25.6	18
.7	18.73	32	51.6	20	21.07	53	43.9	8	37.83	32	71.0	22	6.60	36	24.2	14
.7	19.04	31	49.8	18	21.57	50	43.6	3	38.14	31	73.1	21	6.95	35	23.1	11
.6	19.33	29	48.2	16	22.04	47	43.9	3	38.42	28	75.1	20	7.28	33	22.3	8
.6	19.59	26	46.9	13	22.47	43	44.6	7	38.67	25	77.0	19	7.58	30	22.0	3
.6	19.81	22	45.7	12	22.84	37	45.8	12	38.89	22	78.7	17	7.84	26	22.0	0
.6	20.00	19	44.8	9	23.15	31	47.3	15	39.08	19	80.2	15	8.06	22	22.3	3
.5	20.14	14	44.2	6	23.38	23	49.2	19	39.22	14	81.5	13	8.22	16	23.0	7
.5	20.25	11	43.9	3	23.53	15	51.5	23	39.32	10	82.6	11	8.34	12	24.0	10
.5	20.31	6	43.8	1	23.60	7	53.9	24	39.38	6	83.5	9	8.41	7	25.3	13
.5	20.33	2	43.9	1	23.60	0	56.4	25	39.41	3	84.1	6	8.43	2	26.7	14
.4	20.32	1	44.2	3	23.52	8	58.8	24	39.40	1	84.5	4	8.41	2	28.2	15
.4	20.28	4	44.7	5	23.38	14	61.2	24	39.36	4	84.7	2	8.35	6	29.8	16
.4	20.21	7	45.2	5	23.18	20	63.3	21	39.30	6	84.7	0	8.26	9	31.3	15
.3	20.13	8	45.9	7	22.93	25	65.2	19	39.22	8	84.5	2	8.14	12	32.7	14
.3	20.03	10	46.6	7	22.65	28	66.6	14	39.12	10	84.2	3	8.01	13	34.0	13
.3	19.92	11	47.3	7	22.35	30	67.6	10	39.02	10	83.7	5	7.87	14	35.0	10
.3	19.81	11	48.0	7	22.05	30	68.1	5	38.91	11	83.2	5	7.72	15	35.8	8
.2	19.71	10	48.6	6	21.75	30	68.1	0	38.81	10	82.6	6	7.58	14	36.2	4
.2	19.62	9	49.1	5	21.47	28	67.6	5	38.72	9	81.9	7	7.45	13	36.3	1
.2	19.53	9	49.6	5	21.22	25	66.5	11	38.63	9	81.2	7	7.33	12	36.1	2
ı δ	1.014		−0.168		1.926		−1.646		1.001		+0.049		1.192		−0.649	
ce	16ˢ.942		61″.94		17ˢ.952		67″.14		36ˢ.184		64″.74		4ˢ.459		41″.79	
a	0.00		+0.01		+0.01		+0.11		0.00		0.00		0.00		+0.04	
j	+0.4		−0.2		+0.4		−0.2		+0.4		−0.2		+0.4		−0.2	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	**ο Cephei.** Mag. 4.9				**τ Pegasi.** Mag. 4.6				**b^1 Aquarii.** Mag. 4.2				**4 Cassiopeiæ.** Mag. 5.2			
	Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination N.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	23 14		+67 37		23 16		+23 15		23 18		−20 34		23 20		+61 47	
	s		″		s		″		s		″		s		″	
Jan. 1.2	57.59		60.5		15.61		32.5		20.24		64.5		53.09		70.6	
11.2	57.15	44	59.2	13	15.50	11	31.3	12	20.15	9	64.6	1	52.75	34	69.4	12
21.1	56.74	41	57.5	17	15.41	9	30.0	13	20.08	7	64.4	2	52.44	31	67.7	17
31.1	56.40	34	55.3	22	15.34	7	28.5	15	20.03	5	64.0	4	52.18	26	65.5	22
Feb. 10.1	56.13	27	52.7	26	15.29	5	27.0	15	20.00	3	63.3	7	51.97	21	63.0	25
20.1	55.94	19	49.8	29	15.28	1	25.4	16	20.00	0	62.4	9	51.83	14	60.3	27
Mar. 1.0	55.85	9	46.9	29	15.29	1	24.0	14	20.03	3	61.3	11	51.76	7	57.4	29
11.0	55.87	2	43.9	30	15.34	5	22.7	13	20.09	6	60.0	13	51.78	2	54.6	28
21.0	55.99	12	41.0	29	15.44	10	21.6	11	20.19	10	58.4	16	51.88	10	51.9	27
30.9	56.22	23	38.4	26	15.58	14	20.8	8	20.33	14	56.6	18	52.06	18	49.4	25
Apr. 9.9	56.55	33	36.1	23	15.75	17	20.4	4	20.50	17	54.7	19	52.33	27	47.2	22
19.9	56.97	42	34.2	19	15.97	22	20.3	1	20.71	21	52.7	20	52.68	35	45.4	18
29.9	57.47	50	32.8	14	16.22	25	20.7	4	20.96	25	50.5	22	53.09	41	44.2	12
May 9.8	58.03	56	32.0	8	16.51	29	21.4	7	21.24	28	48.3	22	53.55	46	43.5	7
19.8	58.64	61	31.7	3	16.82	31	22.5	11	21.54	30	46.0	23	54.06	51	43.3	2
29.8	59.28	64	32.0	3	17.15	33	23.9	14	21.86	32	43.9	21	54.60	54	43.7	4
June 8.8	59.93	65	32.9	9	17.48	33	25.7	18	22.20	34	41.8	21	55.14	54	44.7	10
18.7	60.57	64	34.4	15	17.82	34	27.7	20	22.54	34	39.8	20	55.68	54	46.2	15
28.7	61.19	62	36.3	19	18.15	33	30.0	23	22.88	34	38.1	17	56.21	53	48.1	19
July 8.7	61.76	57	38.7	24	18.47	32	32.4	24	23.20	32	36.6	15	56.70	49	50.5	24
18.6	62.28	52	41.5	28	18.76	29	35.0	26	23.50	30	35.3	13	57.15	45	53.3	28
28.6	62.73	45	44.7	32	19.02	26	37.6	26	23.78	28	34.4	9	57.55	40	56.4	31
Aug. 7.6	63.11	38	48.1	34	19.25	23	40.1	25	24.02	24	33.8	6	57.88	33	59.8	34
17.6	63.40	29	51.7	36	19.43	18	42.6	25	24.22	20	33.5	3	58.15	27	63.3	35
27.5	63.60	20	55.4	37	19.58	15	45.0	24	24.38	16	33.5	0	58.35	20	66.9	36
Sept. 6.5	63.72	12	59.1	37	19.68	10	47.2	22	24.50	12	33.8	3	58.47	12	70.6	37
16.5	63.75	3	62.8	37	19.74	6	49.2	20	24.57	7	34.3	5	58.52	5	74.2	36
26.5	63.69	6	66.4	36	19.76	2	51.0	18	24.60	3	35.0	7	58.50	2	77.6	34
Oct. 6.4	63.55	14	69.8	34	19.74	2	52.6	16	24.59	1	36.0	10	58.41	9	80.9	33
16.4	63.34	21	73.0	32	19.69	5	53.9	13	24.54	5	37.0	10	58.26	15	83.9	30
26.4	63.05	29	75.8	28	19.62	7	54.9	10	24.47	7	38.1	11	58.06	20	86.6	27
Nov. 5.3	62.71	34	78.2	24	19.53	9	55.6	7	24.38	9	39.1	10	57.81	25	88.9	23
15.3	62.31	40	80.2	20	19.42	11	56.0	4	24.27	11	40.1	10	57.52	29	90.8	19
25.3	61.87	44	81.7	15	19.30	12	56.1	1	24.16	11	41.0	9	57.19	33	92.1	13
Dec. 5.3	61.41	46	82.6	9	19.18	12	55.9	2	24.04	12	41.8	8	56.85	34	92.9	8
15.2	60.93	48	82.9	3	19.06	12	55.4	5	23.93	11	42.4	6	56.49	36	93.2	3
25.2	60.46	47	82.6	3	18.94	12	54.7	7	23.82	11	42.8	4	56.13	36	92.9	3
35.2	60.00	46	81.7	9	18.83	11	53.7	10	23.72	10	43.0	2	55.78	35	92.0	9
Sec δ, Tan δ	2.628		+2.430		1.089		+0.430		1.068		−0.375		2.116		+1.866	
Mean Place	$60^{s}.413$		47″.67		$16^{s}.757$		30″.50		$20^{s}.996$		52″.21		$55^{s}.341$		58″.46	
$D'_\psi\,\alpha$, $D_\omega\,\alpha$	−0.01		−0.16		0.00		−0.03		0.00		+0.02		−0.01		−0.12	
$D_\psi\,\delta$, $D_\omega\,\delta$	+0.4		−0.2		+0.4		−0.2		+0.4		−0.2		+0.4		−0.2	

FOR THE UPPER TRANSIT AT WASHINGTON.

an Solar Date.	υ Pegasi. Mag. 4.6 Right Ascension.		υ Pegasi. Declination N.		κ Piscium. Mag. 4.9 Right Ascension.		κ Piscium. Declination N.		θ Piscium. Mag. 4.4 Right Ascension.		θ Piscium. Declination N.		70 Pegasi. Mag. 4.7 Right Ascension.		70 Pegasi. Declination N.	
	h m 23 20 s		° ′ +22 55 ″		h m 23 22 s		° ′ + 0 46 ″		h m 23 23 s		° ′ + 5 53 ″		h m 23 24 s		° ′ +12 16 ″	
n. 1.2	57.99	11	12.0	11	24.40	8	20.4	7	29.29	9	40.5	8	41.20	9	28.6	10
11.2	57.88	9	10.9	13	24.32	7	19.7	6	29.20	7	39.7	8	41.11	8	27.6	10
21.1	57.79	7	9.6	14	24.25	6	19.1	6	29.13	6	38.9	8	41.03	6	26.6	10
31.1	57.72	5	8.2	15	24.19	3	18.5	5	29.07	3	38.1	8	40.97	4	25.6	10
b. 10.1	57.67	2	6.7	15	24.16	0	18.0	4	29.04	1	37.3	6	40.93	2	24.6	10
20.1	57.65	1	5.2	15	24.16	2	17.6	1	29.03	2	36.7	4	40.91	2	23.6	8
ar. 1.0	57.66	5	3.7	12	24.18	5	17.5	0	29.05	5	36.3	3	40.93	5	22.8	7
11.0	57.71	9	2.5	11	24.23	9	17.5	3	29.10	9	36.0	1	40.98	9	22.1	4
21.0	57.80	13	1.4	8	24.32	13	17.8	5	29.19	12	35.9	2	41.07	12	21.7	1
30.9	57.93	17	0.6	4	24.45	16	18.3	8	29.31	16	36.1	5	41.19	16	21.6	1
pr. 9.9	58.10	22	0.2	0	24.61	20	19.1	10	29.47	20	36.6	8	41.35	20	21.7	4
19.9	58.32	25	0.2	3	24.81	24	20.1	13	29.67	23	37.4	11	41.55	24	22.1	8
29.9	58.57	28	0.5	7	25.05	26	21.4	16	29.90	27	38.5	14	41.79	27	22.9	11
y 9.8	58.85	31	1.2	11	25.31	29	23.0	18	30.17	29	39.9	16	42.06	29	24.0	14
19.8	59.16	32	2.3	14	25.60	31	24.8	19	30.46	31	41.5	18	42.35	31	25.4	17
29.8	59.48	34	3.7	18	25.91	32	26.7	20	30.77	32	43.3	20	42.66	33	27.1	19
ne 8.8	59.82	34	5.5	20	26.23	32	28.7	21	31.09	32	45.3	21	42.99	33	29.0	21
18.7	60.16	33	7.5	23	26.55	32	30.8	21	31.41	32	47.4	21	43.32	32	31.1	22
28.7	60.49	32	9.8	24	26.87	31	32.9	21	31.73	31	49.5	22	43.64	31	33.3	23
ly 8.7	60.81	29	12.2	25	27.18	29	35.0	20	32.04	28	51.7	21	43.95	29	35.6	23
18.6	61.10	27	14.7	25	27.47	26	37.0	18	32.32	26	53.8	20	44.24	26	37.9	22
28.6	61.37	23	17.2	26	27.73	23	38.8	16	32.58	23	55.8	19	44.50	23	40.1	21
g. 7.6	61.60	19	19.8	25	27.96	19	40.4	14	32.81	19	57.7	17	44.73	19	42.2	20
17.6	61.79	15	22.3	23	28.15	15	41.8	12	33.00	15	59.4	15	44.92	15	44.2	19
27.5	61.94	11	24.6	22	28.30	11	43.0	10	33.15	11	60.9	13	45.07	11	46.1	16
pt. 6.5	62.05	6	26.8	20	28.41	7	44.0	7	33.26	7	62.2	10	45.18	7	47.7	14
16.5	62.11	3	28.8	18	28.48	3	44.7	5	33.33	3	63.2	8	45.25	3	49.1	12
26.5	62.14	1	30.6	16	28.51	0	45.2	3	33.36	0	64.0	6	45.28	0	50.3	10
t. 6.4	62.13	4	32.2	13	28.51	3	45.5	1	33.36	3	64.6	3	45.28	3	51.3	7
16.4	62.09	7	33.5	10	28.48	6	45.6	1	33.33	5	64.9	1	45.25	5	52.0	5
26.4	62.02	9	34.5	7	28.42	7	45.5	3	33.28	8	65.0	0	45.20	8	52.5	2
v. 5.3	61.93	10	35.2	4	28.35	9	45.2	4	33.20	9	65.0	2	45.12	9	52.7	0
15.3	61.83	12	35.6	2	28.26	10	44.8	5	33.11	10	64.8	3	45.03	10	52.7	1
25.3	61.71	12	35.8	2	28.16	10	44.3	5	33.01	10	64.5	5	44.93	11	52.6	4
c. 5.3	61.59	12	35.6	5	28.06	10	43.8	6	32.91	10	64.0	6	44.82	11	52.2	6
15.2	61.47	12	35.1	7	27.96	10	43.2	7	32.81	10	63.4	7	44.71	10	51.6	7
25.2	61.35	11	34.4	10	27.86	9	42.5	7	32.71	9	62.7	7	44.61	10	50.9	8
35.2	61.24		33.4		27.77		41.8		32.62		62.0		44.51		50.1	
, Tan δ	1.086		+0.423		1.000		+0.014		1.005		+0.103		1.024		+0.218	
n Place	$59^{s}.114$		9″.99		$25^{s}.283$		25″.64		$30^{s}.208$		43″.98		$42^{s}.178$		29″.87	
a, Dω α	0.00		−0.03		0.00		0.00		0.00		−0.01		0.00		−0.01	
, Dω δ	+0.4		−0.2		+0.4		−0.2		+0.4		−0.2		+0.4		−0.2	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	**β Sculptoris.** Mag. 4.5				**72 Pegasi (*mean*).** Mag. 5.2				**λ Andromedæ.** Mag. 4.0				**ι Andromedæ.** Mag. 4.3			
	Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination N.	
	h m 23 28		° ′ −38 17		h m 23 29		° ′ +30 50		h m 23 33		° ′ +45 58		h m 23 33		° ′ +42 46	
	s		″		s		″		s		″		s		″	
Jan. 1.2	14.75		95.8		33.89		27.5		13.71		62.1		47.60		59.6	
11.2	14.62	13	95.3	5	33.76	13	26.3	12	13.52	19	61.0	11	47.42	18	58.4	12
21.1	14.51	11	94.4	9	33.64	12	24.9	14	13.34	18	59.4	16	47.26	16	56.8	16
31.1	14.43	8	93.2	12	33.55	9	23.3	16	13.19	15	57.5	19	47.12	14	55.0	18
Feb. 10.1	14.38	5	91.6	16	33.48	7	21.6	17	13.07	12	55.3	22	47.02	10	52.9	21
20.1	14.36	2	89.7	19	33.44	4	19.7	19	12.99	8	53.0	23	46.95	7	50.7	22
Mar. 1.0	14.37	1	87.6	21	33.43	1	17.9	18	12.96	3	50.6	24	46.92	3	48.4	23
11.0	14.42	5	85.3	23	33.47	4	16.3	16	12.98	2	48.3	23	46.94	2	46.2	22
21.0	14.52	10	82.8	25	33.55	8	14.8	15	13.06	8	46.1	22	47.02	8	44.2	20
31.0	14.66	14	80.1	27	33.67	12	13.6	12	13.19	13	44.1	20	47.15	13	42.4	18
Apr. 9.9	14.84	18	77.4	27	33.84	17	12.7	9	13.38	19	42.5	16	47.33	18	40.9	15
19.9	15.06	22	74.6	28	34.06	22	12.2	5	13.63	25	41.3	12	47.56	23	39.8	11
29.9	15.33	27	71.8	28	34.32	26	12.1	1	13.92	29	40.5	8	47.84	28	39.2	6
May 9.8	15.63	30	69.1	27	34.61	29	12.5	4	14.26	34	40.2	3	48.17	33	39.1	1
19.8	15.97	34	66.6	25	34.93	32	13.2	7	14.63	37	40.4	2	48.53	36	39.4	3
29.8	16.33	36	64.2	24	35.27	34	14.4	12	15.02	39	41.1	7	48.91	38	40.2	8
June 8.8	16.71	38	62.1	21	35.62	35	16.0	16	15.43	41	42.3	12	49.30	39	41.4	12
18.7	17.10	39	60.3	18	35.98	36	17.9	19	15.84	41	43.9	16	49.70	40	43.1	17
28.7	17.48	38	58.9	14	36.33	35	20.1	22	16.24	40	45.9	20	50.08	38	45.2	21
July 8.7	17.85	37	57.8	11	36.66	33	22.5	24	16.63	39	48.3	24	50.45	37	47.6	24
18.7	18.20	35	57.1	7	36.97	31	25.1	26	16.98	35	51.0	27	50.80	35	50.3	27
28.6	18.52	32	56.9	2	37.25	28	27.8	27	17.30	32	53.9	29	51.11	31	53.2	29
Aug. 7.6	18.81	29	57.1	2	37.49	24	30.6	28	17.58	28	57.0	31	51.38	27	56.2	30
17.6	19.05	24	57.6	5	37.70	21	33.4	28	17.81	23	60.2	32	51.60	22	59.3	31
27.5	19.24	19	58.5	9	37.86	16	36.1	27	17.99	18	63.4	32	51.78	18	62.5	32
Sept. 6.5	19.38	14	59.8	13	37.98	12	38.7	26	18.12	13	66.6	32	51.91	13	65.6	31
16.5	19.47	9	61.3	15	38.05	7	41.1	24	18.20	8	69.7	31	51.99	8	68.5	29
26.5	19.51	4	63.0	17	38.08	3	43.3	22	18.23	3	72.6	29	52.02	3	71.3	28
Oct. 6.4	19.50	1	64.8	18	38.08	0	45.3	20	18.22	1	75.3	27	52.01	1	73.9	26
16.4	19.44	6	66.6	18	38.04	4	47.0	17	18.16	6	77.8	25	51.96	5	76.2	23
26.4	19.35	9	68.4	18	37.97	7	48.4	14	18.06	10	79.9	21	51.87	9	78.3	21
Nov. 5.4	19.23	12	70.1	17	37.88	9	49.6	12	17.93	13	81.7	18	51.75	12	79.9	16
15.3	19.09	14	71.5	14	37.77	11	50.4	8	17.78	15	83.1	14	51.61	14	81.2	13
25.3	18.93	16	72.6	11	37.64	13	50.8	4	17.60	18	84.1	10	51.45	16	82.1	9
Dec. 5.3	18.77	16	73.5	9	37.50	14	50.9	1	17.41	19	84.6	5	51.27	18	82.5	4
15.2	18.61	16	74.0	5	37.36	14	50.6	3	17.21	20	84.6	0	51.09	18	82.5	0
25.2	18.46	15	74.1	1	37.22	14	49.9	7	17.01	20	84.2	4	50.91	18	82.0	5
35.2	18.32	14	73.8	3	37.09	13	49.0	9	16.81	20	83.3	9	50.73	18	81.1	9
Sec δ, Tan δ	1.274		−0.790		1.165		+0.597		1.440		+1.035		1.363		+0.926	
Mean Place	$15^{s}.332$		$78''.71$		$35^{s}.074$		$22''.56$		$15^{s}.188$		$52''.76$		$48^{s}.994$		$50''.99$	
$D'_{\psi} a$, $D_{\omega} a$	0.00		+0.05		0.00		−0.04		0.00		−0.07		0.00		−0.06	
$D_{\psi} \delta$, $D_{\omega} \delta$	+0.4		−0.1		+0.4		−0.1		+0.4		−0.1		+0.4		−0.1	

FOR THE UPPER TRANSIT AT WASHINGTON.

an Solar Date.	ι Piscium. Mag. 4.3				γ Cephei. Mag. 3.4				κ Andromedæ. Mag. 4.3				ω² Aquarii. Mag. 4.6			
	Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination S.	
	h m 23 35 s		° ′ + 5 8 ″		h m 23 35 s		° ′ +77 8 ″		h m 23 36 s		° ′ +43 50 ″		h m 23 38 s		° ′ −15 1 ″	
n. 1.2	24.55		54.0		39.47		43.5		2.79		56.5		8.91		63.3	
11.2	24.46	9	53.2	8	38.60	87	42.7	8	2.61	18	55.4	11	8.82	9	63.6	3
21.2	24.38	8	52.4	8	37.79	81	41.3	14	2.44	17	53.9	15	8.74	8	63.7	1
31.1	24.32	6	51.7	7	37.07	72	39.4	19	2.30	14	52.0	19	8.67	7	63.6	1
b. 10.1	24.28	4	51.0	7	36.47	60	37.0	24	2.19	11	49.9	21	8.63	4	63.2	4
20.1	24.26	2	50.4	6	36.02	45	34.3	27	2.11	8	47.7	22	8.61	2	62.7	5
ar. 1.0	24.27	1	50.0	4	35.73	29	31.4	29	2.08	3	45.4	23	8.62	1	61.9	8
11.0	24.31	4	49.8	2	35.62	11	28.3	31	2.10	2	43.1	23	8.66	4	60.9	10
21.0	24.39	8	49.8	0	35.70	8	25.3	30	2.17	7	41.0	21	8.73	7	59.6	13
31.0	24.50	11	50.0	2	35.96	26	22.4	29	2.30	13	39.1	19	8.85	12	58.2	14
pr. 9.9	24.65	15	50.5	5	36.39	43	19.8	26	2.48	18	37.6	15	9.00	15	56.5	17
19.9	24.84	19	51.3	8	36.99	60	17.5	23	2.72	24	36.5	11	9.19	19	54.6	19
29.9	25.07	23	52.4	11	37.73	74	15.7	18	3.00	28	35.8	7	9.41	22	52.6	20
ay 9.8	25.33	26	53.8	14	38.59	86	14.4	13	3.32	32	35.6	2	9.67	26	50.5	21
19.8	25.61	28	55.4	16	39.53	94	13.6	8	3.68	36	35.9	3	9.96	29	48.3	22
29.8	25.92	31	57.2	18	40.54	101	13.4	2	4.07	39	36.6	7	10.27	31	46.1	22
ne 8.8	26.24	32	59.2	20	41.57	103	13.8	4	4.47	40	37.8	12	10.59	32	44.0	21
18.7	26.56	32	61.3	21	42.60	103	14.8	10	4.87	40	39.5	17	10.93	34	41.9	21
28.7	26.88	32	63.4	21	43.60	100	16.3	15	5.26	39	41.6	21	11.26	33	39.9	20
ly 8.7	27.19	31	65.5	21	44.55	95	18.3	20	5.64	38	44.0	24	11.58	32	38.1	18
18.7	27.49	30	67.5	20	45.41	86	20.8	25	5.99	35	46.6	26	11.89	31	36.6	15
28.6	27.76	27	69.5	20	46.18	77	23.7	29	6.31	32	49.5	29	12.17	28	35.4	12
ug. 7.6	27.99	23	71.4	19	46.84	66	26.9	32	6.58	27	52.6	31	12.42	25	34.4	10
17.6	28.20	21	73.0	16	47.36	52	30.4	35	6.81	23	55.7	31	12.63	21	33.8	6
27.5	28.36	16	74.5	15	47.75	39	34.1	37	6.99	18	58.9	32	12.80	17	33.4	4
pt. 6.5	28.48	12	75.7	12	48.00	25	37.9	38	7.12	13	62.0	31	12.94	14	33.4	0
16.5	28.56	8	76.7	10	48.10	10	41.8	39	7.21	9	65.0	30	13.03	9	33.6	2
26.5	28.61	5	77.5	8	48.06	4	45.6	38	7.24	3	67.8	28	13.08	5	34.0	4
ct. 6.4	28.62	1	78.0	5	47.87	19	49.3	37	7.23	1	70.5	27	13.09	1	34.6	6
16.4	28.60	2	78.3	3	47.54	33	52.8	35	7.18	5	72.8	23	13.07	2	35.4	8
26.4	28.56	4	78.4	1	47.09	45	56.1	33	7.10	8	74.9	21	13.02	5	36.3	9
ov. 5.4	28.49	7	78.3	1	46.52	57	59.0	29	6.98	12	76.6	17	12.95	7	37.3	10
15.3	28.41	8	78.1	2	45.84	68	61.5	25	6.83	15	78.0	14	12.86	9	38.2	9
25.3	28.32	9	77.7	4	45.08	76	63.4	19	6.67	16	78.9	9	12.76	10	39.1	9
ec. 5.3	28.22	10	77.2	5	44.25	83	64.8	14	6.49	18	79.4	5	12.65	11	39.9	8
15.2	28.12	10	76.6	6	43.37	88	65.7	9	6.30	19	79.4	0	12.54	11	40.6	7
25.2	28.02	10	75.9	7	42.47	90	65.9	2	6.11	19	79.0	4	12.44	10	41.1	5
35.2	27.93	9	75.2	7	41.59	88	65.5	4	5.93	18	78.1	9	12.34	10	41.5	4
δ, Tan δ	1.004		+0.090		4.495		+4.382		1.386		+0.961		1.035		−0.269	
n Place	25ˢ.403		57″.30		43ˢ.667		28″.37		4ˢ.198		47″.57		9ˢ.579		53″.23	
α, $D_\omega \alpha$	0.00		−0.01		−0.01		−0.29		0.00		−0.06		0.00		+0.02	
δ, $D_\omega \delta$	+0.4		−0.1		+0.4		−0.1		+0.4		−0.1		+0.4		−0.1	

[Eph 12]

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	i¹ Aquarii. Mag. 5.3				ψ Andromedæ. Mag. 5.1				41 H. Cephei. Mag. 5.0				δ Sculptoris. Mag. 4.6			
	Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination S.	
	h m 23 39		° ′ −18 45		h m 23 41		° ′ +45 55		h m 23 43		° ′ +67 18		h m 23 44		° −28	
	s		″		s		″		s		″		s		″	
Jan. 1.2	37.69	10	67.0	1	38.73	19	63.5	11	39.28	45	78.3	8	20.07	11	76.4	
11.2	37.59	8	67.1	0	38.54	18	62.4	15	38.83	42	77.5	15	19.96	10	76.3	
21.2	37.51	7	67.1	3	38.36	16	60.9	18	38.41	38	76.0	19	19.86	8	75.9	
31.1	37.44	4	66.8	5	38.20	13	59.1	21	38.03	32	74.1	23	19.78	6	75.1	
Feb. 10.1	37.40	2	66.3	8	38.07	9	57.0	22	37.71	24	71.8	26	19.72	3	74.1	
20.1	37.38	0	65.5	10	37.98	4	54.8	24	37.47	15	69.2	29	19.69	0	72.8	
Mar. 1.0	37.38	4	64.5	12	37.94	1	52.4	23	37.32	5	66.3	29	19.69	3	71.3	
11.0	37.42	8	63.3	15	37.95	6	50.1	22	37.27	5	63.4	29	19.72	7	69.5	
21.0	37.50	11	61.8	17	38.01	12	47.9	20	37.32	16	60.5	27	19.79	11	67.4	
31.0	37.61	15	60.1	19	38.13	18	45.9	16	37.48	26	57.8	24	19.90	16	65.2	
Apr. 9.9	37.76	19	58.2	20	38.31	24	44.3	13	37.74	37	55.4	21	20.06	19	62.9	
19.9	37.95	22	56.2	21	38.55	28	43.0	8	38.11	45	53.3	16	20.25	23	60.4	
29.9	38.17	26	54.1	23	38.83	33	42.2	4	38.56	52	51.7	12	20.48	27	57.8	
May 9.9	38.43	29	51.8	23	39.16	37	41.8	2	39.08	58	50.5	5	20.75	30	55.3	
19.8	38.72	31	49.5	22	39.53	39	42.0	7	39.66	62	50.0	1	21.05	32	52.8	24
29.8	39.03	33	47.3	22	39.92	41	42.7	11	40.28	65	49.9	6	21.37	35	50.4	22
June 8.8	39.36	34	45.1	21	40.33	41	43.8	15	40.93	65	50.5	11	21.72	35	48.2	21
18.7	39.70	34	43.0	19	40.74	41	45.3	20	41.58	64	51.6	16	22.07	36	46.1	17
28.7	40.04	33	41.1	17	41.15	39	47.3	24	42.22	60	53.2	21	22.43	34	44.4	15
July 8.7	40.37	31	39.4	14	41.54	36	49.7	26	42.82	56	55.3	25	22.77	33	42.9	11
18.7	40.68	28	38.0	11	41.90	33	52.3	29	43.38	51	57.8	29	23.10	31	41.8	7
28.6	40.96	26	36.9	8	42.23	29	55.2	30	43.89	44	60.7	33	23.41	27	41.1	4
Aug. 7.6	41.22	21	36.1	4	42.52	24	58.2	32	44.33	37	64.0	34	23.68	24	40.7	0
17.6	41.43	18	35.7	1	42.76	19	61.4	32	44.70	28	67.4	36	23.92	19	40.7	3
27.6	41.61	14	35.6	1	42.95	15	64.6	32	44.98	19	71.0	37	24.11	15	41.0	7
Sept. 6.5	41.75	9	35.7	4	43.10	9	67.8	31	45.17	11	74.7	37	24.26	10	41.7	10
16.5	41.84	5	36.1	6	43.19	4	70.9	29	45.28	3	78.4	36	24.36	5	42.7	12
26.5	41.89	1	36.7	9	43.23	0	73.8	27	45.31	5	82.0	35	24.41	1	43.9	14
Oct. 6.4	41.90	2	37.6	10	43.23	5	76.5	25	45.26	14	85.5	33	24.42	2	45.3	15
16.4	41.88	5	38.6	10	43.18	9	79.0	22	45.12	21	88.8	31	24.40	6	46.8	15
26.4	41.83	8	39.6	11	43.09	12	81.2	19	44.91	27	91.9	27	24.34	8	48.3	
Nov. 5.4	41.75	9	40.7	10	42.97	14	83.1	15	44.64	34	94.6	22	24.26	11	49.7	
15.3	41.66	10	41.7	10	42.83	17	84.6	10	44.30	38	96.8	18	24.15	12	51.0	
25.3	41.56	11	42.7	9	42.66	19	85.6	6	43.92	42	98.6	13	24.03	12	52.2	
Dec. 5.3	41.45	11	43.6	7	42.47	19	86.2	1	43.50	45	99.9	6	23.91	13	53.2	
15.3	41.34	11	44.3	5	42.28	20	86.3	3	43.05	46	100.5	1	23.78	13	53.9	
25.2	41.23	11	44.8	2	42.08	20	86.0	8	42.59	46	100.6	5	23.65	12	54.3	
35.2	41.12		45.0		41.88		85.2		42.13		100.1		23.53		54.4	
Sec δ, Tan δ	1.056		−0.340		1.438		+1.033		2.594		+2.393		1.139		−0.546	
Mean Place	38ˢ.324		55″.73		40ˢ.149		53″.72		41ˢ.725		63″.96		20ˢ.601		62″.21	
D′ψ a, Dω a	0.00		+0.02		0.00		−0.07		0.00		−0.16		0.00		+0.04	
Dψ δ, Dω δ	+0.4		−0.1		+0.4		−0.1		+0.4		−0.1		+0.4		−0.1	

FOR THE UPPER TRANSIT AT WASHINGTON.

an Solar Date.	γ^1 **Octantis.** Mag. 5.1				ϕ **Pegasi.** Mag. 5.2				ρ **Cassiopeiæ.** Mag. 4.8				**Groombridge 4163.** Mag. 6.6			
	Right Ascension.		Declination S.		Right Ascension.		Declination N.		Right Ascension.		Declination N.		Right Ascension.		Declination N.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	23 46		−82 30		23 47		+18 37		23 49		+57 0		23 50		+73 55	
	s		″		s		″		s		″		s		″	
n. 1.2	59.39		51.7		59.63		55.2		57.08		48.1		28.89		29.7	
11.2	57.99	140	50.0	17	59.52	11	54.3	9	56.79	29	47.2	9	28.21	68	29.0	7
21.2	56.73	126	47.7	23	59.42	10	53.3	10	56.52	27	45.8	14	27.56	65	27.8	12
31.1	55.64	109	45.0	27	59.33	9	52.1	12	56.28	24	44.0	18	26.98	58	26.0	18
b. 10.1	54.76	88	41.8	32	59.27	6	50.9	12	56.08	20	41.8	22	26.49	49	23.8	22
20.1	54.11	65	38.3	35	59.23	4	49.7	12	55.93	15	39.3	25	26.10	39	21.2	26
r. 1.0	53.70	41	34.6	37	59.22	1	48.5	12	55.84	9	36.7	26	25.84	26	18.3	29
11.0	53.54	16	30.8	38	59.24	2	47.5	10	55.81	3	34.0	27	25.72	12	15.3	30
21.0	53.63	9	26.8	40	59.30	6	46.7	8	55.86	5	31.4	26	25.74	2	12.3	30
31.0	53.97	34	22.9	39	59.40	10	46.2	5	55.98	12	29.0	24	25.92	18	9.4	29
r. 9.9	54.56	59	19.1	38	59.54	14	45.9	3	56.18	20	26.9	21	26.24	32	6.8	26
19.9	55.38	82	15.5	36	59.73	19	46.0	1	56:45	27	25.1	18	26.69	45	4.5	23
29.9	56.42	104	12.2	33	59.95	22	46.4	4	56.78	33	23.8	13	27.27	58	2.6	19
y 9.9	57.65	123	9.2	30	60.21	26	47.2	8	57.17	39	22.9	9	27.95	68	1.2	14
19.8	59.06	141	6.5	27	60.50	29	48.3	11	57.61	44	22.6	3	28.71	76	0.4	8
29.8	60.60	154	4.3	22	60.81	31	49.8	15	58.08	47	22.8	2	29.53	82	0.1	3
ne 8.8	62.26	166	2.6	17	61.14	33	51.5	17	58.56	48	23.6	8	30.38	85	0.4	3
18.7	63.98	172	1.4	12	61.48	34	53.4	19	59.06	50	24.8	12	31.24	86	1.2	8
28.7	65.72	174	0.8	6	61.81	33	55.5	21	59.55	49	26.6	18	32.09	85	2.6	14
ly 8.7	67.44	172	0.8	0	62.13	32	57.8	23	60.02	47	28.7	21	32.90	81	4.5	19
18.7	69.08	164	1.3	5	62.44	31	60.2	24	60.46	44	31.3	26	33.65	75	6.9	24
28.6	70.60	152	2.4	11	62.72	28	62.6	24	60.86	40	34.2	29	34.33	68	9.7	28
g. 7.6	71.97	137	4.0	16	62.97	25	64.9	23	61.21	35	37.3	31	34.92	59	12.8	31
17.6	73.12	115	6.0	20	63.18	21	67.1	22	61.51	30	40.6	33	35.41	49	16.2	34
27.6	74.03	91	8.5	25	63.36	18	69.2	21	61.74	23	44.0	34	35.80	39	19.8	36
pt. 6.5	74.66	63	11.2	27	63.50	14	71.2	20	61.92	18	47.5	35	36.07	27	23.6	38
16.5	74.99	33	14.1	29	63.59	9	73.0	18	62.03	11	51.0	35	36.22	15	27.4	38
26.5	75.01	2	17.1	30	63.64	5	74.6	16	62.08	5	54.3	33	36.26	4	31.1	37
t. 6.4	74.73	28	20.1	30	63.66	2	75.9	13	62.07	1	57.5	32	36.19	7	34.8	37
16.4	74.15	58	22.9	28	63.65	1	77.0	11	62.01	6	60.5	30	36.00	19	38.3	35
26.4	73.30	85	25.5	26	63.62	3	77.9	9	61.90	11	63.2	27	35.70	30	41.6	33
v. 5.4	72.20	110	27.7	22	63.56	6	78.5	6	61.74	16	65.6	24	35.31	39	44.5	29
15.3	70.90	130	29.4	17	63.48	8	78.8	3	61.53	21	67.6	20	34.83	48	47.1	26
25.3	69.46	144	30.6	12	63.38	10	78.9	1	61.30	23	69.1	15	34.27	56	49.2	21
c. 5.3	67.92	154	31.1	5	63.27	11	78.8	1	61.04	26	70.1	10	33.65	62	50.7	15
15.3	66.35	157	31.0	1	63.16	11	78.4	4	60.76	28	70.6	5	32.99	66	51.6	9
25.2	64.80	155	30.3	7	63.05	11	77.8	6	60.47	29	70.6	0	32.31	68	52.0	4
35.2	63.32	148	29.0	13	62.94	11	77.0	8	60.18	29	70.0	6	31.62	69	51.7	3
δ, Tan δ	7.668		−7.603		1.055		+0.337		1.837		+1.541		3.611		+3.470	
n Place	58ˢ.337		28″.43		60ˢ.540		53″.50		58ˢ.804		35″.34		32ˢ.067		14″.10	
a, $D_\omega a$	+0.01		+0.51		0.00		−0.02		0.00		−0.10		0.00		−0.23	
, $D_\omega \delta$	+0.4		−0.1		+0.4		−0.1		+0.4		0.0		+0.4		0.0	

Mean Solar Date.	ω Piscium. Mag. 4.0				ε Tucanæ. Mag. 4.7				30 Piscium. Mag. 4.7				2 Ceti. Mag. 4.6			
	Right Ascension.		Declination N.		Right Ascension.		Declination S.		Right Ascension.		Declination S.		Right Ascension.		Declination S.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	23 54		+ 6 22		23 55		−66 3		23 57		− 6 29		23 59		−17 49	
	s		″		s		″		s		″		s		″	
Jan. 1.2	46.75		32.0		21.13		81.2		26.21		77.9		13.45		43.8	
11.2	46.66	9	31.2	8	20.74	39	80.0	12	26.11	10	78.4	5	13.34	11	44.0	2
21.2	46.57	9	30.5	7	20.40	34	78.3	17	26.02	9	78.8	4	13.25	9	44.1	1
31.1	46.49	8	29.8	7	20.10	30	76.2	21	25.95	7	79.1	3	13.17	8	43.9	2
Feb. 10.1	46.43	6	29.1	7	19.86	24	73.6	26	25.89	6	79.2	1	13.11	6	43.5	4
20.1	46.39	4	28.5	6	19.68	18	70.6	30	25.85	4	79.1	1	13.07	4	42.8	7
Mar. 1.1	46.38	1	28.0	5	19.57	11	67.4	32	25.84	1	78.8	3	13.05	2	41.8	10
11.0	46.40	2	27.7	3	19.54	3	63.9	35	25.86	2	78.3	5	13.07	2	40.7	11
21.0	46.46	6	27.7	0	19.59	5	60.3	36	25.92	6	77.6	7	13.12	5	39.2	15
31.0	46.55	9	27.9	2	19.73	14	56.6	37	26.01	9	76.6	10	13.21	9	37.6	16
Apr. 9.9	46.69	14	28.3	4	19.94	21	52.9	37	26.14	13	75.4	12	13.34	13	35.8	18
19.9	46.86	17	29.1	8	20.24	30	49.3	36	26.30	16	74.0	14	13.51	17	33.8	20
29.9	47.07	21	30.1	10	20.61	37	45.9	34	26.51	21	72.3	17	13.72	21	31.6	22
May 9.9	47.31	24	31.4	13	21.05	44	42.7	32	26.75	24	70.5	18	13.96	24	29.3	23
19.8	47.59	28	32.9	15	21.56	51	39.8	29	27.02	27	68.5	20	14.24	28	26.9	24
29.8	47.89	30	34.6	17	22.12	56	37.3	25	27.32	30	66.4	21	14.54	30	24.6	23
June 8.8	48.20	31	36.6	20	22.72	60	35.2	21	27.64	32	64.3	21	14.86	32	22.4	22
18.8	48.52	32	38.6	20	23.34	62	33.6	16	27.96	32	62.1	22	15.19	33	20.2	22
28.7	48.85	33	40.7	21	23.98	64	32.5	11	28.29	33	60.0	21	15.53	34	18.2	20
July 8.7	49.17	32	42.9	22	24.61	63	31.9	6	28.61	32	58.1	19	15.86	33	16.4	18
18.7	49.47	30	45.0	21	25.22	61	31.9	0	28.91	30	56.3	18	16.18	32	14.9	15
28.6	49.75	28	47.0	20	25.78	56	32.4	5	29.19	28	54.6	17	16.47	29	13.7	12
Aug. 7.6	50.00	25	48.9	19	26.29	51	33.4	10	29.45	26	53.2	14	16.74	27	12.8	9
17.6	50.22	22	50.7	18	26.73	44	34.9	15	29.67	22	52.1	11	16.97	23	12.2	6
27.6	50.40	18	52.2	15	27.09	36	36.9	20	29.86	19	51.3	8	17.16	19	11.9	3
Sept. 6.5	50.54	14	53.5	13	27.36	27	39.2	23	30.00	14	50.7	6	17.32	16	12.0	1
16.5	50.64	10	54.6	11	27.53	17	41.7	25	30.11	11	50.4	3	17.43	11	12.3	3
26.5	50.71	7	55.4	8	27.60	7	44.5	28	30.18	7	50.3	1	17.50	7	12.9	6
Oct. 6.5	50.74	3	56.0	6	27.58	2	47.3	28	30.21	3	50.4	1	17.53	3	13.7	8
16.4	50.74	0	56.4	4	27.46	12	50.0	27	30.21	0	50.8	4	17.53	0	14.7	10
26.4	50.71	3	56.6	2	27.25	21	52.6	26	30.18	3	51.3	5	17.50	3	15.8	11
Nov. 5.4	50.66	5	56.6	0	26.97	28	54.9	23	30.13	5	51.9	6	17.44	6	16.9	11
15.3	50.59	7	56.4	2	26.63	34	56.8	19	30.06	7	52.6	7	17.36	8	18.0	11
25.3	50.51	8	56.1	3	26.25	38	58.3	15	29.98	8	53.3	7	17.26	10	19.0	10
Dec. 5.3	50.42	9	55.7	4	25.84	41	59.2	9	29.88	10	54.1	8	17.16	10	20.0	10
15.3	50.32	10	55.1	6	25.42	42	59.6	4	29.78	10	54.8	7	17.05	11	20.8	8
25.2	50.22	10	54.5	6	25.00	42	59.4	2	29.68	10	55.4	6	16.94	11	21.4	6
35.2	50.12	10	53.8	7	24.59	41	58.6	8	29.58	10	56.0	6	16.83	11	21.7	3
Sec δ, Tan δ	1.006		+0.112		2.465		−2.253		1.006		−0.114		1.050		−0.322	
Mean Place	$47^{s}.500$		$34''.25$		$21^{s}.044$		$59''.20$		$26^{s}.828$		$71''.24$		$13^{s}.962$		$33''.38$	
$D'_{\psi}\alpha$, $D_{\omega}\alpha$	0.00		−0.01		0.00		+0.15		0.00		+0.01		0.00		+0.02	
$D_{\psi}\delta$, $D_{\omega}\delta$	+0.4		0.0		+0.4		0.0		+0.4		0.0		+0.4		0.0	

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

4 Octantis. Mag. 5.6			**31 Mensæ.** Mag. 6.2			**7 Octantis.** Mag. 6.4			**ζ Octantis.** Mag. 5.4			**η Octantis.** Mag. 6.3		
Mean Solar Date.	Right Ascension.	Declination *South*.	Mean Solar Date.	Right Ascension.	Declination *South*.	Mean Solar Date.	Right Ascension.	Declination *South*.	Mean Solar Date.	Right Ascension.	Declination *South*.	Mean Solar Date.	Right Ascension.	Declination *South*.
	h m	° ′		h m	° ′		h m	° ′		h m	° ′		h m	° ′
Jan.	1 42	−85 13	Jan.	5 47	−84 49	Jan.	7 18	−86 53	Jan.	9 9	−85 18	Jan.	10 59	−84 6
	s	″		s	″		s	″		s	″		s	″
0.3	32.13	11.09	0.5	30.09	49.99	0.5	25.96	21.69	0.6	48.18	24.03	0.7	57.74	50.46
1.3	31.82	11.08	1.5	29.96	50.35	1.5	25.92	22.10	1.6	48.30	24.42	1.7	57.95	50.73
2.3	31.52	11.06	2.5	29.82	50.69	2.5	25.84	22.50	2.6	48.41	24.80	2.7	58.14	51.02
3.3	31.23	11.03	3.5	29.67	51.02	3.5	25.74	22.88	3.6	48.51	25.18	3.7	58.31	51.32
4.3	30.96	10.99	4.5	29.51	51.32	4.5	25.62	23.23	4.6	48.58	25.54	4.7	58.47	51.61
5.3	30.71	10.94	5.5	29.36	51.58	5.5	25.51	23.55	5.6	48.64	25.87	5.7	58.62	51.88
6.3	30.47	10.89	6.4	29.22	51.83	6.5	25.42	23.85	6.6	48.70	26.17	6.7	58.76	52.13
7.3	30.23	10.86	7.4	29.10	52.09	7.5	25.35	24.15	7.6	48.78	26.48	7.7	58.90	52.37
8.3	29.99	10.84	8.4	28.98	52.37	8.5	25.29	24.46	8.6	48.87	26.79	8.7	59.06	52.59
9.3	29.75	10.84	9.4	28.87	52.66	9.5	25.25	24.80	9.6	48.97	27.10	9.7	59.23	52.83
10.3	29.49	10.86	10.4	28.76	52.96	10.5	25.22	25.15	10.6	49.09	27.43	10.7	59.41	53.08
11.3	29.22	10.86	11.4	28.64	53.29	11.5	25.17	25.52	11.6	49.20	27.79	11.7	59.59	53.34
12.3	28.93	10.84	12.4	28.51	53.63	12.5	25.11	25.90	12.6	49.31	28.16	12.6	59.78	53.62
13.3	28.63	10.82	13.4	28.35	53.96	13.5	25.02	26.29	13.6	49.41	28.55	13.6	59.97	53.92
14.3	28.32	10.77	14.4	28.18	54.29	14.5	24.90	26.69	14.6	49.49	28.95	14.6	60.15	54.24
15.3	28.02	10.69	15.4	28.00	54.60	15.5	24.75	27.07	15.6	49.54	29.36	15.6	60.32	54.57
16.3	27.73	10.61	16.4	27.81	54.89	16.5	24.59	27.44	16.6	49.58	29.75	16.6	60.47	54.91
17.2	27.45	10.50	17.4	27.62	55.17	17.5	24.41	27.77	17.6	49.61	30.13	17.6	60.61	55.25
18.2	27.18	10.39	18.4	27.42	55.42	18.5	24.22	28.12	18.6	49.63	30.50	18.6	60.73	55.58
19.2	26.93	10.28	19.4	27.23	55.65	19.5	24.03	28.44	19.6	49.64	30.86	19.6	60.85	55.90
20.2	26.69	10.16	20.4	27.05	55.88	20.5	23.85	28.74	20.6	49.66	31.20	20.6	60.96	56.21
21.2	26.45	10.06	21.4	26.87	56.10	21.5	23.68	29.03	21.5	49.69	31.52	21.6	61.07	56.51
22.2	26.21	9.96	22.4	26.70	56.32	22.5	23.52	29.33	22.5	49.72	31.85	22.6	61.18	56.79
23.2	25.98	9.87	23.4	26.54	56.56	23.5	23.37	29.64	23.5	49.75	32.20	23.6	61.30	57.07
24.2	25.73	9.78	24.4	26.37	56.82	24.5	23.22	29.97	24.5	49.80	32.56	24.6	61.44	57.37
25.2	25.47	9.69	25.4	26.20	57.09	25.5	23.08	30.33	25.5	49.84	32.94	25.6	61.59	57.68
26.2	25.19	9.60	26.4	26.01	57.37	26.5	22.92	30.69	26.5	49.87	33.33	26.6	61.74	58.01
27.2	24.90	9.50	27.4	25.80	57.66	27.5	22.73	31.07	27.5	49.89	33.74	27.6	61.89	58.37
28.2	24.60	9.36	28.4	25.58	57.94	28.5	22.51	31.46	28.5	49.90	34.16	28.6	62.03	58.75
29.2	24.29	9.20	29.4	25.34	58.20	29.4	22.25	31.83	29.5	49.89	34.59	29.6	62.15	59.15
30.2	23.99	9.02	30.4	25.09	58.44	30.4	21.96	32.17	30.5	49.87	35.02	30.6	62.26	59.56
31.2	23.72	8.81	31.4	24.83	58.65	31.4	21.65	32.50	31.5	49.82	35.44	31.6	62.35	59.97
32.2	23.47	8.60	32.4	24.58	58.83	32.4	21.33	32.80	32.5	49.75	35.83	32.6	62.42	60.37
12.00 −11.96			11.10 −11.06			18.44 −18.41			12.23 −12.18			9.75 −9.70		
1^h 42^m $21^s.27$			5^h 47^m $13^s.194$			7^h 18^m $1^s.35$			9^h 9^m $38^s.50$			10^h 59^m $57^s.052$		
−85° 12′ 52″.03			−84° 49′ 53″.11			−86° 53′ 33″.62			−85° 18′ 43″.98			−84° 7′ 13″.77		

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

4 Octantis. Mag 5.6			**81 Mensæ.** Mag. 6.2			**7 Octantis.** Mag. 6.4			**ζ Octantis.** Mag. 5.4			**η Octantis.** Mag. 6.3		
Mean Solar Date.	Right Ascension.	Declination *South.*	Mean Solar Date.	Right Ascension.	Declination *South.*	Mean Solar Date.	Right Ascension.	Declination *South.*	Mean Solar Date.	Right Ascension.	Declination *South.*	Mean Solar Date.	Right Ascension.	Declination *South.*
	h m	° ′		h m	° ′		h m	° ′		h m	° ′		h m	° ′
Feb.	1 42	−85 13	Feb.	5 47	−84 49	Feb.	7 18	−86 53	Feb.	9 9	−85 18	Feb.	11 0	−84 7
	s	″		s	″		s	″		s	″		s	″
1.2	23.47	8.60	1.4	24.58	58.83	1.4	21.33	32.80	1.5	49.75	35.83	1.6	2.42	0.37
2.2	23.23	8.39	2.4	24.33	58.99	2.4	21.03	33.08	2.5	49.68	36.20	2.6	2.48	0.73
3.2	23.00	8.18	3.4	24.10	59.15	3.4	20.75	33.35	3.5	49.62	36.55	3.6	2.54	1.08
4.2	22.79	8.00	4.4	23.89	59.32	4.4	20.50	33.61	4.5	49.57	36.88	4.6	2.61	1.42
5.2	22.57	7.83	5.4	23.69	59.50	5.4	20.26	33.88	5.5	49.54	37.23	5.6	2.69	1.75
6.2	22.34	7.67	6.4	23.48	59.69	6.4	20.03	34.17	6.5	49.51	37.59	6.6	2.78	2.09
7.2	22.09	7.52	7.4	23.26	59.90	7.4	19.79	34.48	7.5	49.50	37.96	7.6	2.88	2.44
8.2	21.83	7.35	8.4	23.04	60.13	8.4	19.54	34.81	8.5	49.48	38.35	8.6	2.99	2.81
9.2	21.56	7.16	9.4	22.81	60.35	9.4	19.28	35.15	9.5	49.45	38.75	9.6	3.09	3.20
10.2	21.30	6.96	10.4	22.55	60.57	10.4	18.99	35.49	10.5	49.40	39.17	10.6	3.19	3.60
11.2	21.03	6.75	11.4	22.29	60.77	11.4	18.66	35.82	11.5	49.33	39.59	11.6	3.27	4.01
12.2	20.76	6.52	12.3	22.01	60.96	12.4	18.32	36.14	12.5	49.25	40.00	12.6	3.34	4.43
13.2	20.50	6.27	13.3	21.74	61.13	13.4	17.96	36.43	13.5	49.16	40.41	13.6	3.39	4.85
14.2	20.25	6.00	14.3	21.47	61.27	14.4	17.60	36.70	14.5	49.05	40.79	14.6	3.43	5.26
15.2	20.03	5.73	15.3	21.20	61.39	15.4	17.24	36.96	15.5	48.93	41.16	15.6	3.46	5.66
16.2	19.83	5.46	16.3	20.93	61.50	16.4	16.89	37.21	16.5	48.82	41.51	16.6	3.49	6.04
17.2	19.65	5.20	17.3	20.68	61.60	17.4	16.54	37.44	17.5	48.72	41.85	17.6	3.50	6.41
18.2	19.45	4.96	18.3	20.44	61.70	18.4	16.19	37.65	18.5	48.61	42.18	18.5	3.52	6.77
19.2	19.25	4.73	19.3	20.19	61.81	19.4	15.87	37.87	19.5	48.51	42.50	19.5	3.55	7.11
20.2	19.06	4.50	20.3	19.96	61.93	20.4	15.57	38.12	20.5	48.42	42.84	20.5	3.60	7.46
21.2	18.85	4.27	21.3	19.72	62.06	21.4	15.27	38.39	21.5	48.34	43.19	21.5	3.65	7.81
22.2	18.62	4.05	22.3	19.47	62.21	22.4	14.95	38.66	22.5	48.26	43.56	22.5	3.70	8.18
23.1	18.39	3.80	23.3	19.20	62.38	23.4	14.61	38.94	23.5	48.17	43.95	23.5	3.76	8.58
24.1	18.14	3.53	24.3	18.92	62.53	24.4	14.24	39.23	24.5	48.06	44.35	24.5	3.81	9.00
25.1	17.88	3.24	25.3	18.63	62.66	25.4	13.84	39.52	25.5	47.93	44.75	25.5	3.85	9.44
26.1	17.63	2.93	26.3	18.32	62.78	26.4	13.42	39.79	26.4	47.79	45.16	26.5	3.86	9.89
27.1	17.42	2.59	27.3	18.00	62.87	27.4	12.97	40.04	27.4	47.63	45.55	27.5	3.86	10.34
28.1	17.23	2.25	28.3	17.69	62.93	28.4	12.51	40.26	28.4	47.45	45.92	28.5	3.84	10.78
29.1	17.06	1.91	29.3	17.39	62.96	29.4	12.06	40.44	29.4	47.27	46.26	29.5	3.81	11.19
30.1	16.91	1.58	30.3	17.10	62.98	30.4	11.63	40.61	30.4	47.08	46.57	30.5	3.77	11.58
	12.00	−11.95		11.11	−11.06		18.45	−18.43		12.23	−12.19		9.76	−9.71
	$1^{h}\ 42^{m}\ 21^{s}.27$			$5^{h}\ 47^{m}\ 13^{s}.194$			$7^{h}\ 18^{m}\ 1^{s}.35$			$9^{h}\ 9^{m}\ 38^{s}.50$			$10^{h}\ 59^{m}\ 57^{s}.052$	
	−85° 12′ 52″.03			−84° 49′ 53″.11			−86° 53′ 33″.62			−85° 18′ 43″.98			−84° 7′ 13″.77	

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

is. 6	**31 Mensæ.** Mag. 6.2			**7 Octantis.** Mag. 6.4			**ζ Octantis.** Mag. 5.4			**η Octantis.** Mag. 6.3		
eclination *South.*	Mean Solar Date.	Right Ascension.	Declination *South.*	Mean Solar Date.	Right Ascension.	Declination *South.*	Mean Solar Date.	Right Ascension.	Declination *South.*	Mean Solar Date.	Right Ascension.	Declination *South.*
° ′		h m	° ′		h m	° ′		h m	° ′		h m	° ′
-85 12	Mar.	5 47	−84 50	Mar.	7 17	−86 53	Mar.	9 9	−85 18	Mar.	11 0	−84 7
″		s	″		s	″		s	″		s	″
61.58	1.3	17.10	2.98	1.4	71.63	40.61	1.4	47.08	46.57	1.5	3.77	11.58
61.27	2.3	16.83	3.02	2.4	71.23	40.78	2.4	46.91	46.87	2.5	3.75	11.95
60.98	3.3	16.57	3.05	3.4	70.85	40.95	3.4	46.76	47.16	3.5	3.74	12.31
60.70	4.3	16.31	3.10	4.4	70.48	41.14	4.4	46.62	47.47	4.5	3.73	12.67
60.43	5.3	16.06	3.16	5.4	70.13	41.34	5.4	46.48	47.81	5.5	3.74	13.04
60.14	6.3	15.79	3.24	6.3	69.75	41.56	6.4	46.35	48.14	6.5	3.75	13.43
59.85	7.3	15.51	3.34	7.3	69.34	41.78	7.4	46.21	48.49	7.5	3.76	13.83
59.55	8.3	15.22	3.43	8.3	68.92	42.02	8.4	46.06	48.85	8.5	3.76	14.24
59.22	9.3	14.92	3.49	9.3	68.49	42.24	9.4	45.89	49.22	9.5	3.75	14.66
58.88	10.3	14.62	3.54	10.3	68.05	42.45	10.4	45.71	49.58	10.5	3.73	15.08
58.52	11.3	14.31	3.57	11.3	67.59	42.65	11.4	45.51	49.92	11.5	3.70	15.50
58.14	12.3	14.00	3.58	12.3	67.11	42.82	12.4	45.30	50.25	12.5	3.65	15.91
57.77	13.3	13.70	3.57	13.3	66.63	42.97	13.4	45.09	50.57	13.5	3.59	16.31
57.41	14.3	13.40	3.54	14.3	66.17	43.10	14.4	44.86	50.86	14.5	3.52	16.70
57.05	15.3	13.12	3.50	15.3	65.72	43.22	15.4	44.64	51.13	15.5	3.44	17.08
56.70	16.3	12.84	3.46	16.3	65.28	43.33	16.4	44.43	51.39	16.5	3.37	17.44
56.37	17.3	12.58	3.42	17.3	64.85	43.42	17.4	44.22	51.65	17.5	3.31	17.79
56.05	18.3	12.32	3.39	18.3	64.44	43.53	18.4	44.02	51.91	18.5	3.26	18.13
55.73	19.2	12.07	3.38	19.3	64.05	43.67	19.4	43.84	52.18	19.5	3.21	18.47
55.41	20.2	11.81	3.39	20.3	63.64	43.82	20.4	43.66	52.47	20.5	3.18	18.83
55.08	21.2	11.54	3.41	21.3	63.22	43.97	21.4	43.48	52.77	21.5	3.15	19.20
54.74	22.2	11.25	3.43	22.3	62.78	44.13	22.4	43.28	53.09	22.5	3.11	19.60
54.38	23.2	10.94	3.43	23.3	62.31	44.30	23.4	43.06	53.42	23.5	3.06	20.02
53.99	24.2	10.62	3.42	24.3	61.81	44.45	24.4	42.83	53.75	24.5	3.00	20.45
53.59	25.2	10.31	3.37	25.3	61.29	44.58	25.4	42.58	54.06	25.4	2.92	20.87
53.17	26.2	10.00	3.30	26.3	60.77	44.68	26.4	42.32	54.34	26.4	2.82	21.28
52.75	27.2	9.69	3.20	27.3	60.25	44.76	27.4	42.05	54.60	27.4	2.70	21.67
52.35	28.2	9.39	3.08	28.3	59.75	44.80	28.4	41.78	54.84	28.4	2.58	22.02
51.96	29.2	9.11	2.96	29.3	59.28	44.85	29.4	41.52	55.06	29.4	2.46	22.36
51.59	30.2	8.85	2.86	30.3	58.83	44.89	30.4	41.27	55.28	30.4	2.35	22.68
51.25	31.2	8.61	2.77	31.3	58.39	44.94	31.4	41.04	55.48	31.4	2.26	22.99
50.90	32.2	8.35	2.69	32.3	57.96	45.00	32.4	40.83	55.70	32.4	2.18	23.32
1.94		11.11	−11.06		18.46	−18.44		12.24	−12.20		9.77	−9.71
$1^s.27$	$5^h\ 47^m\ 13^s.194$			$7^h\ 18^m\ 1^s.35$			$9^h\ 9^m\ 38^s.50$			$10^h\ 59^m\ 57^s.052$		
″.03	−84° 49′ 53″.11			−86° 53′ 33″.62			−85° 18′ 43″.98			−84° 7′ 13″.77		

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

4 Octantis. Mag. 5.6			**81 Mensæ.** Mag. 6.2			**7 Octantis.** Mag. 6.4			**ζ Octantis.** Mag. 5.4			**η Octantis.** Mag. 6.3		
Mean Solar Date.	**Right Ascension.**	**Declination *South*.**	**Mean Solar Date.**	**Right Ascension.**	**Declination *South*.**	**Mean Solar Date.**	**Right Ascension.**	**Declination *South*.**	**Mean Solar Date.**	**Right Ascension.**	**Declination *South*.**	**Mean Solar Date.**	**Right Ascension.**	**Declination *South*.**
	h m	° ′		h m	° ′		h m	° ′		h m	° ′		h m	° ′
Apr.	1 42	−85 12	Apr.	5 47	−84 49	Apr.	7 17	−86 53	Apr.	9 9	−85 18	Apr.	10 59	−84 7
	s	″		s	″		s	″		s	″		s	″
1.0	12.64	50.90	1.2	8.35	62.69	1.3	57.96	45.00	1.4	40.83	55.70	1.4	62.18	23.32
2.0	12.55	50.56	2.2	8.11	62.63	2.3	57.54	45.08	2.4	40.63	55.93	2.4	62.10	23.65
3.0	12.46	50.21	3.2	7.85	62.57	3.3	57.11	45.17	3.3	40.41	56.18	3.4	62.03	24.00
4.0	12.37	49.85	4.2	7.57	62.52	4.3	56.66	45.26	4.3	40.19	56.44	4.4	61.96	24.36
5.0	12.27	49.47	5.2	7.28	62.45	5.3	56.19	45.36	5.3	39.95	56.71	5.4	61.87	24.73
6.0	12.18	49.07	6.2	6.98	62.37	6.3	55.70	45.45	6.3	39.69	56.97	6.4	61.77	25.10
7.0	12.09	48.67	7.2	6.70	62.27	7.3	55.20	45.52	7.3	39.42	57.22	7.4	61.66	25.47
8.0	12.02	48.27	8.2	6.41	62.15	8.3	54.69	45.56	8.3	39.15	57.45	8.4	61.53	25.84
9.0	11.97	47.86	9.2	6.13	62.01	9.3	54.18	45.59	9.3	38.86	57.66	9.4	61.39	26.19
10.0	11.94	47.45	10.2	5.86	61.84	10.3	53.68	45.60	10.3	38.57	57.85	10.4	61.25	26.52
11.0	11.91	47.04	11.2	5.60	61.67	11.2	53.19	45.58	11.3	38.29	58.02	11.4	61.10	26.84
12.0	11.91	46.65	12.2	5.36	61.49	12.2	52.73	45.55	12.3	38.01	58.17	12.4	60.95	27.13
13.0	11.91	46.27	13.2	5.12	61.32	13.2	52.28	45.52	13.3	37.74	58.32	13.4	60.80	27.41
14.0	11.90	45.90	14.2	4.88	61.16	14.2	51.85	45.49	14.3	37.48	58.46	14.4	60.67	27.68
15.0	11.90	45.55	15.2	4.65	61.01	15.2	51.43	45.47	15.3	37.23	58.61	15.4	60.55	27.95
16.0	11.88	45.21	16.2	4.41	60.88	16.2	51.01	45.46	16.3	36.99	58.77	16.4	60.44	28.23
17.0	11.84	44.85	17.2	4.17	60.77	17.2	50.59	45.48	17.3	36.76	58.94	17.4	60.33	28.52
17.9	11.79	44.49	18.2	3.91	60.66	18.2	50.15	45.50	18.3	36.52	59.13	18.4	60.22	28.83
18.9	11.73	44.11	19.2	3.63	60.53	19.2	49.69	45.53	19.3	36.26	59.33	19.4	60.10	29.16
19.9	11.68	43.71	20.2	3.35	60.39	20.2	49.20	45.56	20.3	35.98	59.52	20.4	59.97	29.50
20.9	11.63	43.29	21.2	3.07	60.22	21.2	48.70	45.57	21.3	35.69	59.71	21.4	59.82	29.84
21.9	11.62	42.86	22.2	2.80	60.03	22.2	48.17	45.55	22.3	35.38	59.89	22.4	59.65	30.18
22.9	11.63	42.43	23.2	2.55	59.81	23.2	47.65	45.50	23.3	35.06	60.05	23.4	59.47	30.49
23.9	11.66	42.01	24.2	2.31	59.57	24.2	47.15	45.42	24.3	34.74	60.17	24.4	59.29	30.77
24.9	11.71	41.60	25.1	2.08	59.33	25.2	46.67	45.32	25.3	34.43	60.27	25.4	59.11	31.03
25.9	11.77	41.22	26.1	1.86	59.09	26.2	46.23	45.21	26.3	34.14	60.35	26.4	58.93	31.26
26.9	11.82	40.86	27.1	1.65	58.87	27.2	45.82	45.11	27.3	33.87	60.42	27.4	58.76	31.47
27.9	11.86	40.52	28.1	1.45	58.67	28.2	45.43	45.04	28.3	33.61	60.50	28.4	58.61	31.69
28.9	11.89	40.18	29.1	1.25	58.48	29.2	45.05	44.97	29.3	33.36	60.60	29.4	58.47	31.93
29.9	11.90	39.83	30.1	1.05	58.30	30.2	44.64	44.91	30.3	33.12	60.71	30.4	58.34	32.17
30.9	11.91	39.48	31.1	0.84	58.13	31.2	44.22	44.87	31.3	32.86	60.84	31.3	58.21	32.43
31.9	11.92	39.11	32.1	0.61	57.96	32.2	43.78	44.83	32.3	32.59	60.96	32.3	58.07	32.69
	11.98	−11.93		11.11	−11.06		18.47	−18.44		12.25	−12.21		9.77	−9.72
$1^{h}\ 42^{m}\ 21^{s}.27$			$5^{h}\ 47^{m}\ 13^{s}.194$			$7^{h}\ 18^{m}\ 1^{s}.35$			$9^{h}\ 9^{m}\ 38^{s}.50$			$10^{h}\ 59^{m}\ 57^{s}.052$		
−85° 12′ 52″.03			−84° 49′ 53″.11			−86° 53′ 33″.62			−85° 18′ 43″.98			−84° 7′ 13″.77		

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

4 Octantis. Mag. 5.6			**31 Mensæ.** Mag. 6.2			**7 Octantis.** Mag. 6.4			**ζ Octantis.** Mag. 5.4			**η Octantis.** Mag. 6.3		
an lar te.	Right Ascension.	Declination *South.*	Mean Solar Date.	Right Ascension.	Declination *South.*	Mean Solar Date.	Right Ascension.	Declination *South.*	Mean Solar Date.	Right Ascension.	Declination *South.*	Mean Solar Date.	Right Ascension.	Declination *South.*
	h m	° ′		h m	° ′		h m	° ′		h m	° ′		h m	° ′
y	1 42	−85 12	May	5 46	−84 49	May	7 17	−86 53	May	9 9	−85 19	May	10 59	−84 7
	s	″		s	″		s	″		s	″		s	″
.9	11.92	39.11	1.1	60.84	58.13	1.2	44.22	44.87	1.3	32.86	0.84	1.3	58.21	32.43
.9	11.93	38.72	2.1	60.61	57.96	2.2	43.78	44.83	2.3	32.59	0.96	2.3	58.07	32.69
.9	11.95	38.33	3.1	60.37	57.77	3.2	43.33	44.78	3.3	32.30	1.09	3.3	57.92	32.96
.9	11.99	37.93	4.1	60.14	57.56	4.2	42.87	44.71	4.3	32.01	1.21	4.3	57.76	33.23
.9	12.05	37.53	5.1	59.91	57.33	5.2	42.41	44.62	5.3	31.71	1.30	5.3	57.58	33.50
.9	12.12	37.13	6.1	59.69	57.08	6.2	41.94	44.52	6.3	31.40	1.38	6.3	57.38	33.75
9	12.21	36.75	7.1	59.47	56.81	7.2	41.48	44.40	7.3	31.10	1.44	7.3	57.18	33.98
9	12.31	36.38	8.1	59.27	56.53	8.2	41.04	44.26	8.3	30.79	1.48	8.3	56.98	34.19
9	12.42	36.02	9.1	59.08	56.24	9.2	40.61	44.10	9.2	30.49	1.49	9.3	56.77	34.38
9	12.53	35.68	10.1	58.91	55.95	10.2	40.19	43.93	10.2	30.20	1.50	10.3	56.57	34.56
9	12.63	35.35	11.1	58.74	55.68	11.2	39.80	43.76	11.2	29.92	1.50	11.3	56.38	34.72
9	12.72	35.02	12.1	58.58	55.42	12.2	39.43	43.61	12.2	29.65	1.50	12.3	56.20	34.88
9	12.80	34.70	13.1	58.43	55.17	13.2	39.08	43.47	13.2	29.39	1.52	13.3	56.03	35.03
9	12.87	34.39	14.1	58.27	54.95	14.2	38.73	43.35	14.2	29.14	1.55	14.3	55.86	35.20
9	12.92	34.05	15.1	58.10	54.74	15.2	38.37	43.24	15.2	28.89	1.60	15.3	55.70	35.38
9	12.98	33.69	16.1	57.92	54.52	16.2	38.00	43.14	16.2	28.63	1.67	16.3	55.54	35.58
9	13.05	33.30	17.1	57.73	54.28	17.2	37.60	43.04	17.2	28.36	1.73	17.3	55.37	35.79
9	13.14	32.92	18.1	57.53	54.03	18.1	37.17	42.92	18.2	28.07	1.78	18.3	55.19	36.02
9	13.25	32.54	19.1	57.33	53.75	19.1	36.73	42.78	19.2	27.76	1.82	19.3	54.99	36.23
9	13.37	32.17	20.1	57.14	53.45	20.1	36.28	42.60	20.2	27.44	1.83	20.3	54.78	36.42
9	13.51	31.80	21.1	56.97	53.12	21.1	35.85	42.40	21.2	27.14	1.81	21.3	54.56	36.60
9	13.67	31.46	22.1	56.81	52.78	22.1	35.45	42.18	22.2	26.83	1.78	22.3	54.33	36.74
9	13.84	31.14	23.1	56.67	52.45	23.1	35.07	41.95	23.2	26.53	1.72	23.3	54.11	36.85
9	14.00	30.85	24.1	56.54	52.13	24.1	34.73	41.73	24.2	26.25	1.65	24.3	53.90	36.95
9	14.14	30.57	25.1	56.43	51.83	25.1	34.42	41.52	25.2	25.99	1.58	25.3	53.70	37.03
9	14.26	30.28	26.1	56.32	51.55	26.1	34.14	41.32	26.2	25.75	1.52	26.3	53.51	37.12
9	14.38	30.00	27.1	56.21	51.28	27.1	33.85	41.14	27.2	25.52	1.47	27.3	53.34	37.22
9	14.47	29.70	28.1	56.10	51.02	28.1	33.54	40.98	28.2	25.28	1.44	28.3	53.17	37.33
9	14.57	29.39	29.1	55.97	50.77	29.1	33.21	40.82	29.2	25.03	1.43	29.3	53.00	37.45
9	14.69	29.08	30.1	55.83	50.50	30.1	32.87	40.65	30.2	24.77	1.41	30.3	52.82	37.58
9	14.83	28.76	31.0	55.69	50.22	31.1	32.52	40.47	31.2	24.50	1.39	31.3	52.63	37.71
9	14.99	28.43	32.0	55.56	49.92	32.1	32.17	40.29	32.2	24.22	1.34	32.3	52.43	37.83
11.97 −11.93			11.10 −11.06			18.46 −18.44			12.25 −12.21			9.77 −9.72		
1ʰ 42ᵐ 21ˢ.27			5ʰ 47ᵐ 13ˢ.194			7ʰ 18ᵐ 1ˢ.35			9ʰ 9ᵐ 38ˢ.50			10ʰ 59ᵐ 57ˢ.052		
5° 12′ 52″.03			−84° 49′ 53″.11			−86° 53′ 33″.62			−85° 18′ 43″.98			−84° 7′ 13″.77		

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

4 Octantis. Mag. 5.6			**81 Mensæ.** Mag. 6.2			**7 Octantis.** Mag. 6.4			**ζ Octantis.** Mag. 5.4			**η Octant** Mag. 6.	
Mean Solar Date.	Right Ascension.	Declination *South*.	Mean Solar Date.	Right Ascension.	Declination *South*.	Mean Solar Date.	Right Ascension.	Declination *South*.	Mean Solar Date.	Right Ascension.	Declination *South*.	Mean Solar Date.	Right Ascension.
	h m	° ′		h m	° ′		h m	° ′		h m	° ′		h m
June	1 42	−85 12	June	5 46	−84 49	June	7 17	−86 53	June	9 9	−85 18	June	10 59
	s	″		s	″		s	″		s	″		s
1.9	14.99	28.43	1.0	55.56	49.92	1.1	32.17	40.29	1.2	24.22	61.34	1.3	52.43
2.9	15.16	28.09	2.0	55.43	49.60	2.1	31.81	40.07	2.2	23.93	61.28	2.3	52.21
3.9	15.34	27.78	3.0	55.30	49.26	3.1	31.47	39.83	3.2	23.64	61.20	3.3	51.99
4.9	15.53	27.47	4.0	55.19	48.92	4.1	31.13	39.58	4.2	23.36	61.10	4.3	51.77
5.9	15.73	27.19	5.0	55.09	48.57	5.1	30.81	39.31	5.2	23.09	60.99	5.3	51.55
6.9	15.94	26.93	6.0	55.01	48.22	6.1	30.52	39.03	6.2	22.83	60.86	6.2	51.33
7.9	16.15	26.68	7.0	54.94	47.87	7.1	30.26	38.76	7.2	22.57	60.72	7.2	51.11
8.9	16.34	26.45	8.0	54.88	47.53	8.1	30.02	38.50	8.2	22.33	60.58	8.2	50.90
9.9	16.51	26.21	9.0	54.82	47.22	9.1	29.79	38.25	9.2	22.11	60.45	9.2	50.69
10.9	16.67	25.99	10.0	54.77	46.93	10.1	29.57	38.02	10.2	21.90	60.32	10.2	50.51
11.8	16.82	25.74	11.0	54.71	46.66	11.1	29.34	37.80	11.2	21.69	60.21	11.2	50.34
12.8	16.98	25.47	12.0	54.64	46.38	12.1	29.10	37.60	12.2	21.46	60.12	12.2	50.17
13.8	17.14	25.19	13.0	54.56	46.09	13.1	28.83	37.39	13.2	21.22	60.05	13.2	50.00
14.8	17.31	24.92	14.0	54.47	45.79	14.1	28.54	37.16	14.2	20.98	59.97	14.2	49.81
15.8	17.49	24.64	15.0	54.37	45.47	15.1	28.24	36.92	15.1	20.73	59.87	15.2	49.60
16.8	17.70	24.35	16.0	54.29	45.13	16.1	27.94	36.66	16.1	20.47	59.76	16.2	49.39
17.8	17.93	24.08	17.0	54.21	44.77	17.1	27.65	36.38	17.1	20.19	59.62	17.2	49.16
18.8	18.16	23.83	18.0	54.14	44.38	18.1	27.38	36.07	18.1	19.92	59.45	18.2	48.92
19.8	18.40	23.61	18.9	54.10	44.00	19.1	27.14	35.75	19.1	19.66	59.25	19.2	48.69
20.8	18.64	23.41	19.9	54.08	43.64	20.1	26.94	35.43	20.1	19.43	59.05	20.2	48.47
21.8	18.86	23.23	20.9	54.08	43.30	21.1	26.77	35.13	21.1	19.22	58.85	21.2	48.27
22.8	19.08	23.07	21.9	54.08	42.98	22.1	26.62	34.85	22.1	19.03	58.65	22.2	48.08
23.8	19.29	22.90	22.9	54.07	42.67	23.0	26.47	34.58	23.1	18.86	58.47	23.2	47.90
24.8	19.49	22.73	23.9	54.07	42.38	24.0	26.32	34.32	24.1	18.69	58.31	24.2	47.73
25.8	19.68	22.54	24.9	54.06	42.10	25.0	26.16	34.07	25.1	18.51	58.15	25.2	47.56
26.8	19.87	22.34	25.9	54.04	41.82	26.0	25.99	33.82	26.1	18.31	57.99	26.2	47.39
27.8	20.08	22.14	26.9	54.02	41.52	27.0	25.80	33.56	27.1	18.10	57.84	27.2	47.21
28.8	20.28	21.94	27.9	53.99	41.20	28.0	25.61	33.29	28.1	17.89	57.68	28.2	47.02
29.8	20.51	21.74	28.9	53.97	40.86	29.0	25.42	33.01	29.1	17.67	57.50	29.2	46.82
30.8	20.76	21.55	29.9	53.95	40.51	30.0	25.23	32.71	30.1	17.45	57.30	30.2	46.61
31.8	21.02	21.35	30.9	53.95	40.15	31.0	25.06	32.39	31.1	17.24	57.08	31.2	46.40
	11.97	−11.92		11.10	−11.05		18.45	−18.43		12.25	−12.21		9.77
	$1^{h}\ 42^{m}\ 21^{s}.27$			$5^{h}\ 47^{m}\ 13^{s}.194$			$7^{h}\ 18^{m}\ 1^{s}.35$			$9^{h}\ 9^{m}\ 38^{s}.50$			$10^{h}\ 59^{m}$ 5
	−85° 12′ 52″.03			−84° 49′ 53″.11			−86° 53′ 33″.62			−85° 18′ 43″.98			−84° 7′ 1

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

4 Octantis. Mag. 5.6			**81 Mensæ.** Mag. 6.2			**7 Octantis.** Mag. 6.4			**ζ Octantis.** Mag. 5.4			**η Octantis.** Mag. 6.3		
	Right Ascension.	Declination *South.*	Mean Solar Date.	Right Ascension.	Declination *South.*	Mean Solar Date.	Right Ascension.	Declination *South.*	Mean Solar Date.	Right Ascension.	Declination *South.*	Mean Solar Date.	Right Ascension.	Declination *South.*
	h m	° ′		h m	° ′		h m	° ′		h m	° ′		h m	° ′
uly	1 42	−85 12	July	5 46	−84 49	July	7 17	−86 53	July	9 9	−85 18	July	10 59	−84 7
	s	″		s	″		s	″		s	″		s	″
1.8	21.02	21.35	1.9	53.95	39.79	1.0	25.06	32.39	1.1	17.24	57.08	1.2	46.40	38.07
2.8	21.29	21.18	2.9	53.98	39.43	2.0	24.91	32.06	2.1	17.04	56.83	2.2	46.18	37.98
3.8	21.55	21.04	3.9	54.02	39.06	3.0	24.78	31.71	3.1	16.84	56.58	3.2	45.96	37.86
4.8	21.82	20.92	4.9	54.08	38.71	4.0	24.68	31.37	4.1	16.65	56.32	4.2	45.76	37.73
5.8	22.08	20.80	5.9	54.14	38.38	5.0	24.59	31.03	5.1	16.48	56.06	5.2	45.57	37.58
6.8	22.31	20.70	6.9	54.20	38.08	6.0	24.53	30.71	6.1	16.33	55.81	6.2	45.40	37.44
7.8	22.55	20.62	7.9	54.26	37.80	7.0	24.49	30.40	7.1	16.20	55.56	7.2	45.24	37.30
8.8	22.78	20.52	8.9	54.31	37.53	8.0	24.44	30.11	8.1	16.07	55.32	8.2	45.08	37.17
9.8	22.98	20.41	9.9	54.35	37.26	9.0	24.37	29.84	9.1	15.93	55.10	9.2	44.93	37.07
10.8	23.18	20.30	10.9	54.38	36.97	10.0	24.29	29.59	10.1	15.79	54.90	10.2	44.78	36.98
11.8	23.40	20.17	11.9	54.40	36.67	11.0	24.20	29.33	11.1	15.64	54.71	11.2	44.62	36.89
12.8	23.64	20.01	12.9	54.42	36.35	11.9	24.09	29.05	12.1	15.48	54.50	12.2	44.44	36.81
13.8	23.89	19.85	13.9	54.45	36.02	12.9	23.97	28.76	13.1	15.30	54.28	13.1	44.26	36.72
14.8	24.15	19.72	14.9	54.49	35.67	13.9	23.85	28.44	14.1	15.12	54.05	14.1	44.06	36.62
15.8	24.42	19.61	15.9	54.55	35.30	14.9	23.74	28.09	15.1	14.94	53.78	15.1	43.85	36.49
16.8	24.71	19.53	16.9	54.64	34.95	15.9	23.67	27.73	16.1	14.77	53.50	16.1	43.65	36.33
17.7	25.00	19.47	17.9	54.74	34.62	16.9	23.64	27.36	17.1	14.62	53.20	17.1	43.46	36.14
18.7	25.27	19.42	18.9	54.85	34.31	17.9	23.64	27.01	18.1	14.49	52.88	18.1	43.29	35.94
19.7	25.51	19.40	19.9	54.97	34.03	18.9	23.67	26.68	19.1	14.39	52.58	19.1	43.13	35.73
20.7	25.76	19.37	20.9	55.08	33.77	19.9	23.71	26.37	20.1	14.31	52.30	20.1	42.99	35.53
21.7	25.99	19.35	21.9	55.18	33.52	20.9	23.75	26.08	21.1	14.24	52.03	21.1	42.86	35.34
22.7	26.22	19.33	22.9	55.27	33.27	21.9	23.78	25.80	22.0	14.15	51.77	22.1	42.73	35.16
23.7	26.44	19.30	23.9	55.35	33.02	22.9	23.80	25.54	23.0	14.06	51.52	23.1	42.60	34.99
24.7	26.67	19.25	24.9	55.43	32.76	23.9	23.80	25.28	24.0	13.96	51.27	24.1	42.47	34.84
25.7	26.91	19.21	25.9	55.52	32.48	24.9	23.80	24.99	25.0	13.86	51.02	25.1	42.33	34.68
26.7	27.16	19.16	26.9	55.61	32.18	25.9	23.80	24.69	26.0	13.76	50.76	26.1	42.18	34.51
27.7	27.42	19.11	27.9	55.71	31.87	26.9	23.81	24.38	27.0	13.64	50.48	27.1	42.02	34.33
28.7	27.68	19.07	28.9	55.83	31.55	27.9	23.83	24.06	28.0	13.53	50.19	28.1	41.86	34.14
29.7	27.96	19.06	29.9	55.96	31.24	28.9	23.86	23.72	29.0	13.43	49.88	29.1	41.69	33.92
30.7	28.25	19.08	30.9	56.11	30.93	29.9	23.92	23.37	30.0	13.34	49.55	30.1	41.53	33.68
31.7	28.54	19.10	31.9	56.26	30.64	30.9	24.00	23.02	31.0	13.26	49.21	31.1	41.38	33.43
32.7	28.82	19.14	32.9	56.42	30.37	31.9	24.10	22.68	32.0	13.19	48.88	32.1	41.23	33.17
11.96 −11.92			11.09 −11.04			18.44 −18.41			12.25 −12.21			9.77 −9.72		
1ʰ 42ᵐ 21ˢ.27			5ʰ 47ᵐ 13ˢ.194			7ʰ 18ᵐ 1ˢ.35			9ʰ 9ᵐ 38ˢ.50			10ʰ 59ᵐ 57ˢ.052		
−85° 12′ 52″.03			−84° 49′ 53″.11			−86° 53′ 33″.62			−85° 18′ 43″.98			−84° 7′ 13″.77		

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

4 Octantis. Mag. 5.6			**81 Mensæ.** Mag. 6.2			**7 Octantis.** Mag. 6.4			**ζ Octantis.** Mag. 5.4			**η Octantis.** Mag. 6.3		
Mean Solar Date.	Right Ascension.	Declination *South.*	Mean Solar Date.	Right Ascension.	Declination *South.*	Mean Solar Date.	Right Ascension.	Declination *South.*	Mean Solar Date.	Right Ascension.	Declination *South.*	Mean Solar Date.	Right Ascension.	Declination *South.*
	h m	° ′		h m	° ′		h m	° ′		h m	° ′		h m	° ′
Aug.	1 42	−85 12	Aug.	5 46	−84 49	Aug.	7 17	−86 53	Aug.	9 9	−85 18	Aug.	10 59	−84 7
	s	″		s	″		s	″		s	″		s	″
1.7	28.82	19.14	1.9	56.42	30.37	1.9	24.23	22.35	1.0	13.19	48.88	1.1	41.23	33.17
2.7	29.08	19.20	2.9	56.59	30.11	2.9	24.38	22.05	2.0	13.14	48.54	2.1	41.10	32.89
3.7	29.32	19.27	3.9	56.76	29.88	3.9	24.53	21.76	3.0	13.11	48.22	3.1	40.99	32.62
4.7	29.56	19.33	4.9	56.92	29.67	4.9	24.66	21.49	4.0	13.10	47.92	4.1	40.90	32.36
5.7	29.77	19.40	5.9	57.06	29.48	5.9	24.78	21.24	5.0	13.09	47.63	5.1	40.81	32.12
6.7	29.99	19.44	6.9	57.19	29.28	6.9	24.88	20.98	6.0	13.07	47.36	6.1	40.72	31.90
7.7	30.20	19.47	7.9	57.32	29.07	7.9	24.96	20.72	7.0	13.04	47.10	7.1	40.63	31.69
8.7	30.42	19.50	8.9	57.44	28.84	8.9	25.04	20.45	8.0	13.00	46.84	8.1	40.53	31.49
9.7	30.66	19.50	9.9	57.56	28.59	9.9	25.12	20.16	8.9	12.96	46.57	9.1	40.42	31.29
10.7	30.92	19.53	10.9	57.69	28.32	10.9	25.21	19.85	9.9	12.90	46.28	10.1	40.29	31.09
11.7	31.17	19.57	11.9	57.85	28.05	11.9	25.32	19.54	10.9	12.83	45.97	11.1	40.15	30.86
12.7	31.43	19.62	12.8	58.03	27.79	12.9	25.46	19.22	11.9	12.78	45.65	12.1	40.01	30.60
13.7	31.70	19.70	13.8	58.22	27.54	13.9	25.64	18.89	12.9	12.75	45.31	13.1	39.89	30.31
14.7	31.97	19.81	14.8	58.42	27.31	14.9	25.85	18.58	13.9	12.73	44.95	14.1	39.77	30.01
15.7	32.21	19.94	15.8	58.63	27.11	15.9	26.06	18.30	14.9	12.74	44.61	15.1	39.68	29.69
16.7	32.44	20.08	16.8	58.84	26.94	16.9	26.28	18.05	15.9	12.77	44.28	16.1	39.62	29.38
17.7	32.66	20.22	17.8	59.03	26.78	17.9	26.51	17.81	16.9	12.82	43.97	17.1	39.57	29.09
18.7	32.87	20.36	18.8	59.21	26.64	18.9	26.73	17.59	17.9	12.86	43.68	18.1	39.52	28.81
19.7	33.06	20.48	19.8	59.39	26.50	19.9	26.93	17.38	18.9	12.90	43.41	19.0	39.47	28.55
20.7	33.25	20.60	20.8	59.56	26.35	20.9	27.12	17.16	19.9	12.93	43.14	20.0	39.42	28.29
21.7	33.44	20.71	21.8	59.73	26.19	21.9	27.29	16.94	20.9	12.96	42.88	21.0	39.36	28.05
22.7	33.66	20.81	22.8	59.90	26.01	22.9	27.46	16.69	21.9	12.98	42.60	22.0	39.29	27.81
23.6	33.88	20.92	23.8	60.08	25.83	23.9	27.64	16.42	22.9	12.99	42.31	23.0	39.22	27.55
24.6	34.12	21.05	24.8	60.27	25.64	24.9	27.85	16.15	23.9	13.00	42.01	24.0	39.14	27.27
25.6	34.37	21.19	25.8	60.47	25.45	25.9	28.08	15.87	24.9	13.02	41.69	25.0	39.07	26.98
26.6	34.60	21.35	26.8	60.68	25.26	26.9	28.32	15.59	25.9	13.06	41.36	26.0	38.99	26.67
27.6	34.84	21.52	27.8	60.91	25.08	27.9	28.59	15.33	26.9	13.11	41.03	27.0	38.92	26.35
28.6	35.07	21.70	28.8	61.15	24.92	28.9	28.88	15.07	27.9	13.17	40.69	28.0	38.87	26.01
29.6	35.29	21.91	29.8	61.39	24.79	29.9	29.19	14.83	28.9	13.25	40.35	29.0	38.83	25.66
30.6	35.49	22.13	30.8	61.63	24.68	30.9	29.51	14.62	29.9	13.34	40.02	30.0	38.80	25.32
31.6	35.68	22.35	31.8	61.87	24.61	31.9	29.84	14.43	30.9	13.44	39.71	31.0	38.79	24.99
32.6	35.85	22.57	32.8	62.09	24.53	32.9	30.15	14.26	31.9	13.55	39.43	32.0	38.79	24.68
	11.96	−11.92		11.09	−11.04		18.42	−18.40		12.24	−12.20		9.77	−9.72
$1^h\ 42^m\ 21^s.27$			$5^h\ 47^m\ 13^s.194$			$7^h\ 18^m\ 1^s.35$			$9^h\ 9^m\ 38^s.50$			$10^h\ 59^m\ 57^s.052$		
−85° 12′ 52″.03			−84° 49′ 53″.11			−86° 53′ 33″.62			−85° 18′ 43″.98			−84° 7′ 13″.77		

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

Octantis. Mag. 5.6		**31 Mensæ.** Mag. 6.2			**7 Octantis.** Mag. 6.4			**ζ Octantis.** Mag. 5.4			**η Octantis.** Mag. 6.3		
Right Ascension.	**Declination** *South.*	**Mean Solar Date.**	**Right Ascension.**	**Declination** *South.*	**Mean Solar Date.**	**Right Ascension.**	**Declination** *South.*	**Mean Solar Date.**	**Right Ascension.**	**Declination** *South.*	**Mean Solar Date.**	**Right Ascension.**	**Declination** *South.*
h m	° ′		h m	° ′		h m	° ′		h m	° ′		h m	° ′
1 42	−85 12	Sept.	5 47	−84 49	Sept.	7 17	−86 53	Sept.	9 9	−85 18	Sept.	10 59	−84 7
s	″		s	″		s	″		s	″		s	″
35.85	22.57	1.8	2.09	24.53	1.9	30.15	14.26	1.9	13.67	39.16	1.0	38.79	24.68
36.01	22.77	2.8	2.30	24.47	2.9	30.43	14.09	2.9	13.78	38.91	2.0	38.79	24.38
36.15	22.96	3.8	2.50	24.39	3.9	30.69	13.93	3.9	13.87	38.68	3.0	38.80	24.10
36.30	23.14	4.8	2.69	24.31	4.8	30.94	13.76	4.9	13.95	38.45	4.0	38.80	23.85
36.47	23.29	5.8	2.87	24.21	5.8	31.16	13.58	5.9	14.02	38.20	5.0	38.79	23.60
36.65	23.45	6.8	3.06	24.10	6.8	31.39	13.38	6.9	14.09	37.93	5.9	38.76	23.34
36.83	23.63	7.8	3.26	23.97	7.8	31.64	13.16	7.9	14.17	37.63	6.9	38.72	23.07
37.03	23.82	8.8	3.48	23.84	8.8	31.93	12.93	8.9	14.26	37.31	7.9	38.68	22.77
37.24	24.04	9.8	3.72	23.73	9.8	32.24	12.70	9.9	14.36	36.99	8.9	38.64	22.45
37.45	24.28	10.8	3.98	23.64	10.8	32.58	12.49	10.9	14.49	36.68	9.9	38.63	22.11
37.63	24.53	11.8	4.24	23.58	11.8	32.95	12.31	11.9	14.64	36.39	10.9	38.64	21.76
37.79	24.81	12.8	4.50	23.55	12.8	33.32	12.16	12.9	14.79	36.12	11.9	38.65	21.41
37.94	25.08	13.8	4.75	23.55	13.8	33.69	12.03	13.9	14.96	35.87	12.9	38.69	21.08
38.06	25.35	14.8	4.98	23.55	14.8	34.05	11.91	14.9	15.13	35.64	13.9	38.74	20.77
38.16	25.61	15.6	5.20	23.57	15.8	34.39	11.81	15.9	15.29	35.42	14.9	38.79	20.48
38.26	25.86	16.8	5.41	23.59	16.8	34.71	11.72	16.9	15.43	35.21	15.9	38.85	20.20
38.37	26.10	17.7	5.62	23.59	17.8	35.02	11.62	17.9	15.56	35.01	16.9	38.90	19.94
38.48	26.34	18.7	5.83	23.57	18.8	35.34	11.50	18.9	15.70	34.79	17.9	38.94	19.68
38.61	26.57	19.7	6.04	23.55	19.8	35.65	11.37	19.9	15.85	34.56	18.9	38.98	19.41
38.75	26.81	20.7	6.26	23.52	20.8	35.98	11.23	20.9	15.99	34.31	19.9	39.00	19.13
38.90	27.05	21.7	6.48	23.48	21.8	36.32	11.08	21.9	16.15	34.05	20.9	39.02	18.84
39.05	27.31	22.7	6.72	23.45	22.8	36.67	10.93	22.9	16.30	33.78	21.9	39.05	18.54
39.19	27.60	23.7	6.97	23.44	23.8	37.03	10.79	23.9	16.47	33.52	22.9	39.08	18.22
39.33	27.89	24.7	7.23	23.43	24.8	37.42	10.67	24.9	16.65	33.26	23.9	39.12	17.89
39.47	28.20	25.7	7.50	23.46	25.8	37.84	10.56	25.9	16.86	33.02	24.9	39.18	17.56
39.57	28.53	26.7	7.76	23.51	26.8	38.27	10.47	26.9	17.08	32.79	25.9	39.25	17.22
39.65	28.86	27.7	8.01	23.59	27.8	38.69	10.41	27.9	17.31	32.59	26.9	39.34	16.89
39.72	29.18	28.7	8.25	23.68	28.8	39.10	10.38	28.9	17.54	32.40	27.9	39.44	16.59
39.77	29.49	29.7	8.48	23.79	29.8	39.49	10.37	29.9	17.75	32.24	28.9	39.55	16.31
39.81	29.78	30.7	8.69	23.89	30.8	39.86	10.35	30.9	17.96	32.10	29.9	39.66	16.05
39.86	30.06	31.7	8.89	23.98	31.8	40.20	10.33	31.9	18.15	31.96	30.9	39.77	15.81
.97	−11.93		11.08	−11.04		18.41	−18.39		12.24	−12.20		9.77	−9.71
42^m	$21^s.27$		$5^h\ 47^m$	$13^s.194$		$7^h\ 18^m$	$1^s.35$		$9^h\ 9^m$	$38^s.50$		$10^h\ 59^m$	$57^s.052$
12′	52″.03		−84° 49′	53″.11		−86° 53′	33″.62		−85° 18′	43″.98		−84° 7′	13″.77

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

4 Octantis. Mag. 5.6			**31 Mensæ.** Mag. 6.2			**7 Octantis.** Mag. 6.4			**ζ Octantis.** Mag. 5.4			**η Octantis.** Mag. 6.3		
Mean Solar Date.	Right Ascension.	Declination *South*.	Mean Solar Date.	Right Ascension.	Declination *South*.	Mean Solar Date.	Right Ascension.	Declination *South*.	Mean Solar Date.	Right Ascension.	Declination *South*.	Mean Solar Date.	Right Ascension.	Decl
	h m	° ′		h m	° ′		h m	° ′		h m	° ′		h m	° ′
Oct.	1 42	−85 12	Oct.	5 47	−84 49	Oct.	7 17	−86 53	Oct.	9 9	−85 18	Oct.	10 59	−84 7
	s	″		s	″		s	″		s	″		s	″
1.5	39.86	30.06	1.7	8.89	23.98	1.8	40.20	10.33	1.9	18.15	31.96	1.9	39.87	15.59
2.5	39.90	30.32	2.7	9.08	24.06	2.8	40.53	10.30	2.8	18.35	31.81	2.9	39.96	15.37
3.5	39.97	30.57	3.7	9.28	24.12	3.8	40.85	10.26	3.8	18.52	31.65	3.9	40.03	15.14
4.5	40.05	30.82	4.7	9.48	24.17	4.8	41.17	10.20	4.8	18.69	31.48	4.9	40.11	14.89
5.5	40.13	31.09	5.7	9.70	24.21	5.8	41.51	10.13	5.8	18.88	31.29	5.9	40.18	14.62
6.5	40.21	31.36	6.7	9.93	24.26	6.8	41.88	10.06	6.8	19.09	31.08	6.9	40.26	14.33
7.5	40.30	31.67	7.7	10.17	24.33	7.8	42.29	10.01	7.8	19.31	30.88	7.9	40.35	14.02
8.5	40.37	32.01	8.7	10.42	24.43	8.8	42.72	9.98	8.8	19.54	30.69	8.9	40.47	13.73
9.5	40.43	32.36	9.7	10.67	24.56	9.8	43.16	9.97	9.8	19.79	30.53	9.9	40.61	13.45
10.5	40.46	32.71	10.7	10.91	24.72	10.8	43.59	9.99	10.8	20.05	30.39	10.9	40.75	13.18
11.5	40.47	33.05	11.7	11.13	24.90	11.7	44.01	10.04	11.8	20.31	30.28	11.9	40.91	12.94
12.5	40.45	33.38	12.7	11.33	25.09	12.7	44.40	10.11	12.8	20.57	30.19	12.9	41.07	12.72
13.5	40.43	33.69	13.7	11.52	25.27	13.7	44.77	10.18	13.8	20.81	30.11	13.9	41.23	12.52
14.5	40.41	33.98	14.7	11.71	25.44	14.7	45.13	10.24	14.8	21.06	30.05	14.9	41.37	12.33
15.5	40.39	34.27	15.7	11.90	25.60	15.7	45.48	10.30	15.8	21.29	29.96	15.9	41.50	12.13
16.5	40.39	34.54	16.7	12.09	25.74	16.7	45.82	10.34	16.8	21.50	29.87	16.9	41.62	11.93
17.5	40.40	34.83	17.7	12.27	25.87	17.7	46.17	10.37	17.8	21.72	29.77	17.9	41.75	11.73
18.5	40.41	35.12	18.7	12.46	26.00	18.7	46.53	10.38	18.8	21.95	29.66	18.9	41.87	11.52
19.5	40.42	35.42	19.7	12.67	26.14	19.7	46.90	10.40	19.8	22.18	29.54	19.9	42.00	11.29
20.5	40.45	35.72	20.7	12.89	26.29	20.7	47.29	10.43	20.8	22.42	29.43	20.9	42.13	11.06
21.5	40.47	36.05	21.7	13.10	26.45	21.7	47.70	10.46	21.8	22.66	29.32	21.9	42.28	10.81
22.5	40.47	36.39	22.7	13.31	26.62	22.7	48.12	10.52	22.8	22.93	29.22	22.9	42.44	10.57
23.5	40.45	36.74	23.7	13.53	26.83	23.7	48.55	10.61	23.8	23.22	29.13	23.9	42.61	10.36
24.5	40.40	37.10	24.6	13.74	27.06	24.7	48.97	10.71	24.8	23.51	29.07	24.9	42.80	10.15
25.5	40.35	37.44	25.6	13.94	27.31	25.7	49.38	10.83	25.8	23.80	29.03	25.9	43.00	9.95
26.5	40.27	37.78	26.6	14.13	27.57	26.7	49.78	10.98	26.8	24.08	29.02	26.9	43.20	9.78
27.5	40.18	38.09	27.6	14.29	27.83	27.7	50.15	11.14	27.8	24.35	29.03	27.9	43.40	9.64
28.5	40.08	38.39	28.6	14.44	28.08	28.7	50.48	11.29	28.8	24.61	29.06	28.9	43.60	9.53
29.5	40.00	38.66	29.6	14.58	28.32	29.7	50.79	11.44	29.8	24.85	29.08	29.9	43.78	9.42
30.5	39.93	38.91	30.6	14.72	28.54	30.7	51.09	11.58	30.8	25.09	29.08	30.8	43.94	9.31
31.5	39.86	39.16	31.6	14.85	28.75	31.7	51.39	11.71	31.8	25.32	29.07	31.8	44.09	9.19
32.5	39.80	39.42	32.6	15.00	28.93	32.7	51.70	11.82	32.8	25.55	29.06	32.8	44.25	9.05
	11.97	−11.93		11.08	−11.04		18.41	−18.38		12.23	−12.19		9.76	−9.71
	$1^h\ 42^m\ 21^s.27$			$5^h\ 47^m\ 13^s.194$			$7^h\ 18^m\ 1^s.35$			$9^h\ 9^m\ 38^s.50$			$10^h\ 59^m\ 57^s.052$	
	−85° 12′ 52″.03			−84° 49′ 53″.11			−86° 53′ 33″.62			−85° 18′ 43″.98			−84° 7′ 13″.77	

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

ctantis. Mag. 5.6		31 Mensæ. Mag. 6.2			7 Octantis. Mag. 6.4			ζ Octantis. Mag. 5.4			η Octantis. Mag. 6.3		
ght cen- on.	Declination South.	Mean Solar Date.	Right Ascension.	Declination South.	Mean Solar Date.	Right Ascension.	Declination South.	Mean Solar Date.	Right Ascension.	Declination South.	Mean Solar Date.	Right Ascension.	Declination South.
m	° ′		h m	° ′		h m	° ′		h m	° ′		h m	° ′
42	−85 12	Nov.	5 47	−84 49	Nov.	7 17	−86 53	Nov.	9 9	−85 18	Nov.	10 59	−84 7
	″		s	″		s	″		s	″		s	″
.80	39.42	1.6	15.00	28.93	1.7	51.70	11.82	1.8	25.55	29.06	1.8	44.25	9.05
.76	39.70	2.6	15.17	29.13	2.7	52.03	11.90	2.8	25.80	29.02	2.8	44.40	8.89
.73	40.00	3.6	15.35	29.34	3.7	52.40	12.01	3.8	26.05	28.98	3.8	44.57	8.72
.67	40.33	4.6	15.52	29.57	4.7	52.78	12.14	4.8	26.32	28.97	4.8	44.76	8.55
58	40.65	5.6	15.70	29.84	5.7	53.16	12.31	5.8	26.60	28.97	5.8	44.97	8.39
48	40.98	6.6	15.87	30.13	6.7	53.54	12.49	6.8	26.90	29.00	6.8	45.19	8.25
36	41.31	7.6	16.02	30.44	7.7	53.91	12.69	7.8	27.20	29.05	7.8	45.42	8.13
23	41.61	8.6	16.16	30.76	8.7	54.26	12.91	8.7	27.49	29.12	8.8	45.65	8.05
07	41.90	9.6	16.28	31.09	9.7	54.58	13.15	9.7	27.77	29.21	9.8	45.87	7.99
92	42.17	10.6	16.39	31.40	10.7	54.88	13.38	10.7	28.03	29.32	10.8	46.08	7.94
77	42.43	11.6	16.48	31.69	11.7	55.17	13.61	11.7	28.28	29.42	11.8	46.29	7.90
63	42.68	12.6	16.57	31.97	12.7	55.44	13.83	12.7	28.52	29.51	12.8	46.49	7.85
51	42.91	13.6	16.67	32.24	13.7	55.70	14.03	13.7	28.77	29.60	13.8	46.68	7.79
39	43.16	14.6	16.77	32.50	14.7	55.97	14.21	14.7	29.00	29.66	14.8	46.86	7.74
28	43.41	15.6	16.88	32.75	15.7	56.26	14.39	15.7	29.24	29.71	15.8	47.05	7.67
17	43.67	16.6	16.99	33.02	16.6	56.56	14.57	16.7	29.50	29.77	16.8	47.24	7.59
05	43.94	17.6	17.11	33.30	17.6	56.87	14.76	17.7	29.75	29.83	17.8	47.44	7.51
93	44.21	18.6	17.24	33.59	18.6	57.18	14.97	18.7	30.01	29.90	18.8	47.65	7.43
79	44.49	19.6	17.36	33.89	19.6	57.51	15.20	19.7	30.29	29.99	19.8	47.87	7.36
62	44.79	20.6	17.48	34.22	20.6	57.84	15.45	20.7	30.58	30.10	20.8	48.11	7.30
45	45.06	21.6	17.58	34.58	21.6	58.15	15.72	21.7	30.86	30.23	21.8	48.36	7.26
27	45.32	22.6	17.67	34.93	22.6	58.44	16.02	22.7	31.14	30.38	22.8	48.61	7.25
06	45.58	23.6	17.74	35.30	23.6	58.70	16.33	23.7	31.40	30.55	23.8	48.86	7.27
84	45.81	24.6	17.80	35.65	24.6	58.92	16.64	24.7	31.66	30.74	24.8	49.10	7.31
64	46.02	25.6	17.82	35.99	25.6	59.12	16.94	25.7	31.90	30.95	25.8	49.32	7.37
45	46.21	26.6	17.85	36.32	26.6	59.30	17.22	26.7	32.12	31.15	26.8	49.54	7.45
26	46.38	27.6	17.87	36.62	27.6	59.47	17.49	27.7	32.32	31.33	27.8	49.73	7.52
08	46.54	28.6	17.90	36.90	28.6	59.64	17.74	28.7	32.52	31.49	28.8	49.91	7.54
92	46.71	29.6	17.94	37.17	29.6	59.83	17.97	29.7	32.73	31.63	29.8	50.09	7.56
74	46.88	30.5	17.99	37.46	30.6	60.04	18.21	30.7	32.95	31.77	30.8	50.29	7.57
58	47.08	31.5	18.05	37.77	31.6	60.27	18.46	31.7	33.18	31.93	31.8	50.50	7.58
	−11.94		11.09	−11.04		18.42	−18.39		12.23	−12.19		9.76	−9.71
	$21^s.27$	$5^h\ 47^m\ 13^s.194$			$7^h\ 18^m\ 1^s.35$			$9^h\ 9^m\ 38^s.50$			$10^h\ 59^m\ 57^s.052$		
	52″.03	−84° 49′ 53″.11			−86° 53′ 33″.62			−85° 18′ 43″.98			−84° 7′ 13″.77		

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

4 Octantis. Mag. 5.6			**81 Mensæ.** Mag. 6.2			**7 Octantis.** Mag. 6.4			**ζ Octantis.** Mag. 5.4			**η Octantis.** Mag. 6.3		
Mean Solar Date.	Right Ascension.	Declination *South.*	Mean Solar Date.	Right Ascension.	Declination *South.*	Mean Solar Date.	Right Ascension.	Declination *South.*	Mean Solar Date.	Right Ascension.	Declination *South.*	Mean Solar Date.	Right Ascension.	Declination *South.*
	h m	° ′		h m	° ′		h m	° ′		h m	° ′		h m	° ′
Dec.	1 42	−85 12	Dec.	5 47	−84 49	Dec.	7 18	−86 53	Dec.	9 9	−85 18	Dec.	10 59	−84 [illegible]
	s	″		s	″		s	″		s	″		s	″
1.4	35.58	47.08	1.5	18.05	37.77	1.6	0.27	18.46	1.7	33.18	31.93	1.8	50.50	[illegible]
2.4	35.41	47.31	2.5	18.12	38.10	2.6	0.51	18.74	2.7	33.42	32.09	2.8	50.72	[illegible]
3.4	35.21	47.55	3.5	18.18	38.46	3.6	0.76	19.04	3.7	33.68	32.27	3.8	50.96	[illegible]
4.4	34.99	47.77	4.5	18.23	38.83	4.6	0.99	19.37	4.7	33.94	32.49	4.8	51.22	[illegible]
5.4	34.76	47.98	5.5	18.26	39.22	5.6	1.20	19.72	5.7	34.20	32.72	5.8	51.48	7.73
6.4	34.50	48.17	6.5	18.27	39.61	6.6	1.38	20.08	6.7	34.44	32.97	6.7	51.73	7.84
7.4	34.24	48.33	7.5	18.26	39.98	7.6	1.53	20.44	7.7	34.66	33.24	7.7	51.97	7.97
8.4	33.99	48.47	8.5	18.24	40.34	8.6	1.66	20.79	8.7	34.86	33.50	8.7	52.19	8.10
9.4	33.74	48.60	9.5	18.22	40.68	9.6	1.76	21.11	9.7	35.05	33.76	9.7	52.41	8.23
10.4	33.51	48.72	10.5	18.20	41.01	10.6	1.86	21.42	10.7	35.24	34.01	10.7	52.61	8.36
11.3	33.29	48.84	11.5	18.17	41.32	11.6	1.96	21.73	11.7	35.42	34.24	11.7	52.81	8.48
12.3	33.08	48.96	12.5	18.13	41.62	12.6	2.08	22.03	12.7	35.59	34.47	12.7	53.00	8.60
13.3	32.88	49.08	13.5	18.12	41.92	13.6	2.20	22.32	13.7	35.77	34.69	13.7	53.20	8.70
14.3	32.67	49.21	14.5	18.12	42.23	14.6	2.32	22.60	14.6	35.96	34.90	14.7	53.39	8.79
15.3	32.46	49.35	15.5	18.11	42.54	15.6	2.45	22.90	15.6	36.16	35.13	15.7	53.59	8.89
16.3	32.25	49.50	16.5	18.10	42.87	16.6	2.59	23.21	16.6	36.36	35.37	16.7	53.80	8.99
17.3	32.01	49.65	17.5	18.10	43.23	17.6	2.74	23.55	17.6	36.57	35.62	17.7	54.02	9.10
18.3	31.75	49.79	18.5	18.08	43.62	18.6	2.87	23.90	18.6	36.78	35.89	18.7	54.26	9.24
19.3	31.48	49.93	19.5	18.05	44.00	19.6	2.98	24.28	19.6	37.00	36.19	19.7	54.50	9.40
20.3	31.20	50.04	20.5	18.00	44.39	20.6	3.07	24.68	20.6	37.20	36.52	20.7	54.74	9.58
21.3	30.92	50.12	21.5	17.92	44.77	21.6	3.12	25.08	21.6	37.38	36.85	21.7	54.97	9.79
22.3	30.64	50.18	22.5	17.83	45.13	22.6	3.13	25.47	22.6	37.55	37.19	22.7	55.19	10.03
23.3	30.35	50.22	23.5	17.72	45.48	23.5	3.11	25.84	23.6	37.69	37.53	23.7	55.40	10.27
24.3	30.08	50.23	24.5	17.62	45.80	24.5	3.08	26.18	24.6	37.80	37.86	24.7	55.58	10.51
25.3	29.83	50.25	25.5	17.51	46.10	25.5	3.06	26.51	25.6	37.91	38.18	25.7	55.75	10.73
26.3	29.59	50.26	26.5	17.41	46.37	26.5	3.04	26.82	26.6	38.02	38.47	26.7	55.91	10.93
27.3	29.36	50.29	27.5	17.33	46.65	27.5	3.04	27.12	27.6	38.14	38.75	27.7	56.08	11.12
28.3	29.14	50.33	28.5	17.26	46.94	28.5	3.05	27.43	28.6	38.27	39.02	28.7	56.26	11.30
29.3	28.91	50.40	29.5	17.20	47.25	29.5	3.09	27.76	29.6	38.42	39.31	29.7	56.45	11.47
30.3	28.67	50.46	30.5	17.13	47.58	30.5	3.14	28.11	30.6	38.58	39.62	30.7	56.66	11.66
31.3	28.39	50.53	31.5	17.06	47.93	31.5	3.17	28.48	31.6	38.75	39.94	31.7	56.87	11.88
32.3	28.09	50.59	32.5	16.96	48.30	32.5	3.17	28.88	32.6	38.91	40.29	32.7	57.08	12.11
	11.98	−11.94		11.10	−11.05		18.43	−18.40		12.23	−12.19		9.76	−9.71
$1^h\ 42^m\ 21^s.27$			$5^h\ 47^m\ 13^s.194$			$7^h\ 18^m\ 1^s.35$			$9^h\ 9^m\ 38^s.50$			$10^h\ 59^m\ 57^s.052$		
−85° 12′ 52″.03			−84° 49′ 53″.11			−86° 53′ 33″.62			−85° 18′ 43″.98			−84° 7′ 13″.77		

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

ι Octantis. Mag. 5.4			**δ Octantis.** Mag. 4.1			**χ Octantis.** Mag. 5.2			**σ Octantis.** Mag. 5.5			**υ Octantis.** Mag. 5.7		
Mean Solar Date.	**Right Ascension.**	**Declination *South*.**	**Mean Solar Date.**	**Right Ascension.**	**Declination *South*.**	**Mean Solar Date.**	**Right Ascension.**	**Declination *South*.**	**Mean Solar Date.**	**Right Ascension.**	**Declination *South*.**	**Mean Solar Date.**	**Right Ascension.**	**Declination *South*.**
	h m	° ′		h m	° ′		h m	° ′		h m	° ′		h m	° ′
Jan.	12 45	−84 38	Jan.	14 12	−83 15	Jan.	18 2	−87 39	Jan.	19 18	−89 14	Jan	22 14	−86 25
	s	″		s	″		s	″		s	″		s	″
0.8	30.61	22.60	0.8	31.89	40.44	0.9	34.98	57.96	1.0	0.03	16.26	1.1	59.45	20.20
1.8	30.91	22.72	1.8	32.13	40.43	1.9	35.29	57.61	2.0	0.36	15.86	2.1	59.23	19.88
2.7	31.19	22.86	2.8	32.37	40.43	2.9	35.62	57.28	3.0	0.81	15.48	3.1	59.03	19.57
3.7	31.45	23.01	3.8	32.59	40.46	3.9	35.97	56.97	4.0	1.32	15.13	4.1	58.86	19.26
4.7	31.69	23.17	4.8	32.80	40.50	4.9	36.31	56.69	5.0	1.85	14.80	5.1	58.71	18.97
5.7	31.91	23.33	5.8	33.00	40.53	5.9	36.63	56.44	6.0	2.34	14.48	6.1	58.57	18.69
6.7	32.12	23.47	6.8	33.18	40.55	6.9	36.92	56.20	7.0	2.73	14.18	7.1	58.42	18.43
7.7	32.34	23.60	7.8	33.36	40.55	7.9	37.19	55.94	8.0	3.04	13.88	8.1	58.24	18.19
8.7	32.57	23.70	8.8	33.55	40.54	8.9	37.44	55.67	9.0	3.27	13.58	9.1	58.04	17.95
9.7	32.81	23.79	9.8	33.75	40.52	9.9	37.69	55.38	10.0	3.46	13.26	10.1	57.83	17.68
10.7	33.05	23.89	10.8	33.95	40.49	10.9	37.96	55.07	10.9	3.67	12.91	11.1	57.61	17.39
11.7	33.31	24.00	11.8	34.18	40.48	11.9	38.25	54.74	11.9	3.95	12.54	12.1	57.39	17.09
12.7	33.59	24.14	12.8	34.41	40.48	12.9	38.58	54.40	12.9	4.32	12.16	13.1	57.18	16.77
13.7	33.87	24.30	13.8	34.64	40.50	13.9	38.95	54.07	13.9	4.80	11.78	14.1	56.98	16.44
14.7	34.14	24.48	14.8	34.88	40.53	14.9	39.35	53.75	14.9	5.39	11.41	15.1	56.80	16.10
15.7	34.39	24.67	15.8	35.12	40.58	15.9	39.76	53.45	15.9	6.08	11.04	16.1	56.65	15.75
16.7	34.64	24.88	16.8	35.34	40.65	16.9	40.19	53.17	16.9	6.84	10.69	17.1	56.52	15.40
17.7	34.88	25.10	17.8	35.55	40.74	17.9	40.63	52.91	17.9	7.66	10.35	18.1	56.41	15.05
18.7	35.11	25.32	18.8	35.76	40.84	18.9	41.06	52.67	18.9	8.50	10.03	19.1	56.31	14.72
19.7	35.32	25.53	19.8	35.96	40.95	19.9	41.47	52.44	19.9	9.33	9.72	20.1	56.21	14.40
20.7	35.52	25.74	20.8	36.16	41.05	20.9	41.87	52.21	20.9	10.12	9.42	21.1	56.11	14.10
21.7	35.72	25.94	21.8	36.36	41.14	21.9	42.26	51.99	21.9	10.84	9.13	22.1	56.00	13.80
22.7	35.93	26.13	22.8	36.55	41.22	22.9	42.64	51.76	22.9	11.51	8.84	23.1	55.88	13.50
23.7	36.15	26.31	23.8	36.74	41.28	23.9	43.01	51.52	23.9	12.14	8.54	24.1	55.76	13.21
24.7	36.37	26.49	24.7	36.93	41.34	24.9	43.39	51.26	24.9	12.76	8.22	25.1	55.63	12.89
25.7	36.60	26.68	25.7	37.14	41.40	25.9	43.78	50.98	25.9	13.43	7.88	26.1	55.48	12.55
26.7	36.85	26.89	26.7	37.38	41.46	26.9	44.21	50.69	26.9	14.20	7.52	27.1	55.34	12.18
27.7	37.11	27.12	27.7	37.62	41.55	27.9	44.69	50.40	27.9	15.10	7.15	28.1	55.21	11.78
28.7	37.37	27.38	28.7	37.87	41.67	28.9	45.21	50.12	28.9	16.15	6.78	29.1	55.11	11.37
29.7	37.61	27.67	29.7	38.11	41.82	29.9	45.77	49.85	29.9	17.35	6.42	30.1	55.04	10.96
30.7	37.83	27.97	30.7	38.35	41.99	30.9	46.36	49.62	30.9	18.63	6.09	31.1	55.00	10.56
31.7	38.04	28.28	31.7	38.57	42.18	31.9	46.93	49.42	31.9	19.94	5.79	32.1	54.99	10.17
32.7	38.23	28.59	32.7	38.77	42.39	32.9	47.48	49.24	32.9	21.24	5.50	33.1	55.00	9.81
	10.71	−10.66		8.52	−8.46		24.54	−24.52		75.04	−75.03		16.02	−15.99
$12^h\ 45^m\ 37^s.397$			$14^h\ 12^m\ 41^s.586$			$18^h\ 3^m\ 13^s.216$			$19^h\ 19^m\ 42^s.17$			$22^h\ 15^m\ 6^s.74$		
−84° 38′ 44″.23			−83° 15′ 57″.15			−87° 39′ 53″.25			−89° 14′ 4″.37			−86° 24′ 57″.52		

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

ι Octantis. Mag. 5.4			δ Octantis. Mag. 4.1			χ Octantis. Mag. 5.2			σ Octantis. Mag. 5.5			υ Octantis. Mag. 5.7		
Mean Solar Date.	Right Ascension.	Declination *South.*	Mean Solar Date.	Right Ascension.	Declination *South.*	Mean Solar Date.	Right Ascension.	Declination *South.*	Mean Solar Date.	Right Ascension.	Declination *South.*	Mean Solar Date.	Right Ascension.	Declination *South.*
	h m	° ′		h m	° ′		h m	° ′		h m	° ′		h m	° ′
Feb.	12 45	−84 38	Feb.	14 12	−83 15	Feb.	18 2	−87 39	Feb.	19 18	−89 13	Feb.	22 14	−86 24
	s	″		s	″		s	″		s	″		s	″
1.7	38.23	28.59	1.7	38.77	42.39	1.9	47.48	49.24	1.9	21.24	65.50	1.1	54.99	70.17
2.7	38.40	28.88	2.7	38.96	42.58	2.9	48.01	49.07	2.9	22.49	65.23	2.1	55.00	69.81
3.7	38.57	29.16	3.7	39.14	42.75	3.9	48.52	48.91	3.9	23.61	64.96	3.1	55.00	69.45
4.7	38.75	29.42	4.7	39.33	42.91	4.9	49.00	48.73	4.9	24.66	64.70	4.1	54.99	69.11
5.7	38.93	29.66	5.7	39.52	43.05	5.9	49.47	48.54	5.9	25.66	64.43	5.1	54.95	68.79
6.7	39.13	29.91	6.7	39.72	43.18	6.9	49.94	48.32	6.9	26.65	64.13	6.1	54.89	68.46
7.7	39.34	30.16	7.7	39.93	43.31	7.9	50.42	48.09	7.9	27.67	63.81	7.0	54.82	68.12
8.6	39.56	30.43	8.7	40.14	43.46	8.9	50.94	47.85	8.9	28.76	63.49	8.0	54.75	67.76
9.6	39.78	30.71	9.7	40.36	43.62	9.9	51.49	47.61	9.9	29.95	63.16	9.0	54.68	67.38
10.6	39.99	31.01	10.7	40.59	43.80	10.9	52.06	47.39	10.9	31.25	62.83	10.0	54.62	66.98
11.6	40.20	31.33	11.7	40.81	43.99	11.9	52.66	47.19	11.9	32.63	62.50	11.0	54.59	66.57
12.6	40.40	31.68	12.7	41.02	44.21	12.9	53.28	47.00	12.9	34.09	62.19	12.0	54.59	66.15
13.6	40.58	32.02	13.7	41.22	44.44	13.9	53.90	46.84	13.9	35.61	61.91	13.0	54.60	65.73
14.6	40.75	32.36	14.7	41.42	44.68	14.9	54.51	46.69	14.9	37.15	61.65	14.0	54.63	65.33
15.6	40.90	32.69	15.7	41.61	44.93	15.8	55.11	46.56	15.9	38.67	61.41	15.0	54.68	64.95
16.6	41.04	33.02	16.7	41.78	45.17	16.8	55.70	46.44	16.9	40.15	61.18	16.0	54.74	64.58
17.6	41.18	33.34	17.7	41.95	45.40	17.8	56.27	46.33	17.9	41.59	60.96	17.0	54.80	64.22
18.6	41.31	33.65	18.7	42.11	45.62	18.8	56.82	46.21	18.9	42.96	60.75	18.0	54.86	63.86
19.6	41.45	33.95	19.7	42.28	45.83	19.8	57.35	46.08	19.9	44.26	60.53	19.0	54.91	63.51
20.6	41.60	34.25	20.7	42.46	46.03	20.8	57.88	45.94	20.9	45.49	60.29	20.0	54.94	63.17
21.6	41.76	34.54	21.7	42.65	46.23	21.8	58.42	45.78	21.9	46.75	60.03	21.0	54.96	62.81
22.6	41.93	34.85	22.7	42.84	46.43	22.8	58.99	45.60	22.9	48.09	59.75	22.0	54.97	62.44
23.6	42.12	35.17	23.7	43.04	46.65	23.8	59.60	45.42	23.9	49.52	59.46	23.0	54.99	62.04
24.6	42.30	35.51	24.7	43.25	46.89	24.8	60.24	45.25	24.9	51.11	59.17	24.0	55.02	61.63
25.6	42.47	35.88	25.7	43.46	47.16	25.8	60.92	45.10	25.9	52.84	58.89	24.9	55.06	61.21
26.6	42.63	36.28	26.7	43.66	47.45	26.8	61.62	44.97	26.9	54.65	58.63	25.9	55.12	60.78
27.6	42.77	36.69	27.7	43.85	47.77	27.8	62.34	44.87	27.9	56.54	58.40	26.9	55.21	60.35
28.6	42.89	37.09	28.7	44.02	48.09	28.8	63.04	44.80	28.9	58.44	58.20	27.9	55.33	59.94
29.6	42.99	37.48	29.7	44.17	48.41	29.8	63.71	44.75	29.9	60.26	58.02	28.9	55.48	59.54
30.6	43.08	37.85	30.6	44.32	48.71	30.8	64.34	44.72	30.9	62.00	57.85	29.9	55.63	59.15
	10.71	−10.66		8.52	−8.46		24.52	−24.50		74.77	−74.77		16.01	−15.97
	$12^h\ 45^m\ 37^s.397$			$14^h\ 12^m\ 41^s.586$			$18^h\ 3^m\ 13^s.216$			$19^h\ 19^m\ 42^s.17$			$22^h\ 15^m\ 6^s.74$	
	−84° 38′ 44″.23			−83° 15′ 57″.15			−87° 39′ 53″.25			−89° 14′ 4″.37			−86° 24′ 57″.52	

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

ι Octantis. Mag. 5.4		δ Octantis. Mag. 4.1			χ Octantis. Mag. 5.2			σ Octantis. Mag. 5.5			υ Octantis. Mag. 5.7		
Right Ascension.	Declination *South.*	Mean Solar Date.	Right Ascension.	Declination *South.*	Mean Solar Date.	Right Ascension.	Declination *South.*	Mean Solar Date.	Right Ascension.	Declination *South.*	Mean Solar Date.	Right Ascension.	Declination *South.*
h m	° ′		h m	° ′		h m	° ′		h m	° ′		h m	° ′
12 45	−84 38	Mar.	14 12	−83 15	Mar.	18 3	−87 39	Mar.	19 19	−89 13	Mar.	22 14	−86 24
s	″		s	″		s	″		s	″		s	″
43.08	37.85	1.6	44.32	48.71	1.8	4.34	44.72	1.9	2.00	57.85	1.9	55.78	58.79
43.17	38.20	2.6	44.46	49.00	2.8	4.95	44.67	2.9	3.63	57.68	2.9	55.91	58.44
43.27	38.54	3.6	44.61	49.27	3.8	5.52	44.61	3.9	5.18	57.50	3.9	56.02	58.10
43.38	38.87	4.6	44.76	49.52	4.8	6.09	44.53	4.9	6.68	57.30	4.9	56.11	57.76
43.50	39.20	5.6	44.92	49.76	5.8	6.67	44.43	5.8	8.19	57.09	5.9	56.19	57.41
43.63	39.54	6.6	45.09	50.01	6.8	7.28	44.32	6.8	9.76	56.87	6.9	56.27	57.04
43.76	39.89	7.6	45.27	50.28	7.8	7.91	44.20	7.8	11.40	56.64	7.9	56.36	56.65
43.89	40.27	8.6	45.45	50.57	8.8	8.58	44.10	8.8	13.12	56.41	8.9	56.48	56.24
44.02	40.66	9.6	45.62	50.87	9.8	9.27	44.01	9.8	14.93	56.19	9.9	56.61	55.83
44.14	41.07	10.6	45.79	51.18	10.8	9.97	43.95	10.8	16.82	55.99	10.9	56.75	55.43
44.24	41.48	11.6	45.95	51.51	11.8	10.66	43.91	11.8	18.75	55.82	11.9	56.91	55.04
44.32	41.89	12.6	46.10	51.86	12.8	11.35	43.89	12.8	20.70	55.67	12.9	57.10	54.65
44.39	42.29	13.6	46.24	52.20	13.8	12.03	43.88	13.8	22.64	55.53	13.9	57.30	54.27
44.45	42.69	14.6	46.36	52.54	14.8	12.70	43.89	14.8	24.54	55.41	14.9	57.50	53.92
44.50	43.08	15.6	46.48	52.88	15.8	13.34	43.90	15.8	26.38	55.30	15.9	57.70	53.60
44.54	43.45	16.6	46.60	53.20	16.8	13.96	43.91	16.8	28.15	55.19	16.9	57.90	53.28
44.58	43.82	17.6	46.71	53.51	17.8	14.54	43.92	17.8	29.86	55.08	17.9	58.10	52.97
44.64	44.17	18.6	46.82	53.80	18.8	15.13	43.91	18.8	31.53	54.96	18.9	58.28	52.65
44.71	44.51	19.6	46.94	54.08	19.8	15.73	43.89	19.8	33.18	54.82	19.9	58.44	52.32
44.79	44.86	20.6	47.08	54.37	20.8	16.34	43.86	20.8	34.85	54.66	20.9	58.59	51.97
44.88	45.22	21.6	47.22	54.67	21.8	16.98	43.81	21.8	36.59	54.48	21.9	58.75	51.61
44.97	45.61	22.6	47.37	54.99	22.7	17.65	43.77	22.8	38.44	54.31	22.9	58.92	51.23
45.05	46.01	23.6	47.52	55.33	23.7	18.35	43.75	23.8	40.41	54.15	23.9	59.11	50.83
45.12	46.44	24.6	47.67	55.69	24.7	19.08	43.75	24.8	42.49	54.01	24.9	59.33	50.43
45.17	46.88	25.6	47.80	56.07	25.7	19.81	43.77	25.8	44.64	53.89	25.9	59.57	50.04
45.20	47.32	26.6	47.92	56.46	26.7	20.53	43.82	26.8	46.80	53.79	26.9	59.84	49.67
45.21	47.75	27.6	48.03	56.86	27.7	21.23	43.89	27.8	48.91	53.72	27.9	60.13	49.33
45.21	48.15	28.6	48.12	57.25	28.7	21.89	43.99	28.8	50.92	53.67	28.9	60.42	49.03
45.21	48.54	29.6	48.20	57.62	29.7	22.51	44.07	29.8	52.82	53.64	29.9	60.69	48.74
45.21	48.90	30.6	48.27	57.96	30.7	23.10	44.14	30.8	54.64	53.60	30.9	60.95	48.46
45.22	49.25	31.6	48.35	58.28	31.7	23.67	44.20	31.8	56.38	53.54	31.9	61.18	48.18
45.24	49.60	32.6	48.45	58.59	32.7	24.25	44.23	32.8	58.09	53.46	32.9	61.39	47.89
0.72	−10.67		8.53	−8.47		24.52	−24.49		74.61	−74.60		15.99	−15.96
45^m $37^s.397$			14^h 12^m $41^s.586$			18^h 3^m $13^s.216$			19^h 19^m $42^s.17$			22^h 15^m $6^s.74$	
38′ 44″.23			−83° 15′ 57″.15			−87° 39′ 53″.25			−89° 14′ 4″.37			−86° 24′ 57″.52	

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

ι Octantis. Mag. 5.4			**δ Octantis.** Mag. 4.1			**χ Octantis.** Mag. 5.2			**σ Octantis.** Mag. 5.5			**υ Octantis.** Mag. 5.7		
Mean Solar Date.	**Right Ascension.**	**Declination** ***South.***	**Mean Solar Date.**	**Right Ascension.**	**Declination** ***South.***	**Mean Solar Date.**	**Right Ascension.**	**Declination** ***South.***	**Mean Solar Date.**	**Right Ascension.**	**Declination** ***South.***	**Mean Solar Date.**	**Right Ascension.**	**Declination** ***South.***
	h m	° ′		h m	° ′		h m	° ′		h m	° ′		h m	° ′
Apr.	12 45	−84 38	Apr.	14 12	−83 15	Apr.	18 3	−87 39	Apr.	19 19	−89 13	Apr.	22 15	−86 24
	s	″		s	″		s	″		s	″		s	″
1.5	45.24	49.60	1.6	48.45	58.59	1.7	24.25	44.23	1.8	58.09	53.46	1.9	1.39	47.89
2.5	45.27	49.95	2.6	48.55	58.90	2.7	24.85	44.25	2.8	59.83	53.37	2.9	1.59	47.57
3.5	45.31	50.32	3.6	48.66	59.22	3.7	25.47	44.27	3.8	61.64	53.27	3.9	1.80	47.24
4.5	45.35	50.70	4.6	48.77	59.55	4.7	26.12	44.30	4.8	63.54	53.17	4.9	2.03	46.90
5.5	45.39	51.10	5.6	48.88	59.90	5.7	26.79	44.34	5.8	65.52	53.08	5.9	2.27	46.56
6.5	45.41	51.51	6.6	48.98	60.27	6.7	27.47	44.40	6.8	67.56	53.00	6.9	2.53	46.21
7.5	45.42	51.92	7.5	49.08	60.65	7.7	28.15	44.47	7.8	69.63	52.93	7.9	2.81	45.87
8.5	45.41	52.33	8.5	49.17	61.04	8.7	28.82	44.57	8.8	71.73	52.89	8.9	3.12	45.55
9.5	45.40	52.74	9.5	49.24	61.44	9.7	29.47	44.69	9.8	73.81	52.87	9.9	3.43	45.24
10.5	45.37	53.14	10.5	49.30	61.83	10.7	30.11	44.82	10.8	75.85	52.87	10.9	3.75	44.95
11.5	45.32	53.53	11.5	49.35	62.21	11.7	30.72	44.97	11.7	77.83	52.89	11.9	4.08	44.68
12.5	45.27	53.90	12.5	49.40	62.58	12.7	31.30	45.12	12.7	79.73	52.91	12.9	4.40	44.44
13.5	45.22	54.26	13.5	49.44	62.94	13.7	31.87	45.26	13.7	81.56	52.92	13.9	4.70	44.21
14.5	45.18	54.60	14.5	49.48	63.28	14.7	32.41	45.38	14.7	83.31	52.94	14.9	4.99	43.98
15.5	45.15	54.94	15.5	49.53	63.61	15.7	32.94	45.49	15.7	85.02	52.94	15.9	5.26	43.74
16.5	45.13	55.27	16.5	49.59	63.94	16.7	33.48	45.58	16.7	86.73	52.92	16.9	5.52	43.48
17.5	45.12	55.61	17.5	49.66	64.27	17.7	34.05	45.66	17.7	88.48	52.88	17.9	5.77	43.21
18.5	45.11	55.97	18.5	49.73	64.61	18.7	34.66	45.75	18.7	90.33	52.83	18.9	6.03	42.93
19.5	45.11	56.35	19.5	49.81	64.96	19.7	35.29	45.85	19.7	92.28	52.79	19.8	6.31	42.64
20.5	45.09	56.75	20.5	49.89	65.34	20.7	35.94	45.96	20.7	94.34	52.77	20.8	6.62	42.34
21.4	45.05	57.16	21.5	49.95	65.74	21.7	36.61	46.09	21.7	96.48	52.76	21.8	6.95	42.03
22.4	45.00	57.57	22.5	50.00	66.15	22.7	37.26	46.26	22.7	98.63	52.79	22.8	7.32	41.74
23.4	44.92	57.97	23.5	50.03	66.57	23.7	37.89	46.45	23.7	100.74	52.85	23.8	7.71	41.49
24.4	44.82	58.36	24.5	50.05	66.97	24.7	38.48	46.66	24.7	102.75	52.94	24.8	8.09	41.27
25.4	44.72	58.72	25.5	50.06	67.36	25.7	39.02	46.87	25.7	104.65	53.03	25.8	8.45	41.07
26.4	44.63	59.05	26.5	50.06	67.72	26.7	39.53	47.07	26.7	106.44	53.12	26.8	8.79	40.89
27.4	44.54	59.36	27.5	50.07	68.06	27.7	40.02	47.26	27.7	108.12	53.21	27.8	9.11	40.72
28.4	44.47	59.67	28.5	50.09	68.38	28.6	40.50	47.42	28.7	109.76	53.27	28.8	9.43	40.53
29.4	44.43	59.98	29.5	50.11	68.69	29.6	40.99	47.57	29.7	111.39	53.31	29.8	9.74	40.33
30.4	44.38	60.29	30.5	50.14	69.01	30.6	41.50	47.71	30.7	113.07	53.35	30.8	10.04	40.11
31.4	44.32	60.62	31.5	50.18	69.35	31.6	42.04	47.84	31.7	114.82	53.38	31.8	10.35	39.89
32.4	44.26	60.97	32.5	50.22	69.70	32.6	42.60	47.99	32.7	116.64	53.41	32.8	10.67	39.66
	10.72	−10.68		8.53	−8.47		24.52	−24.50		74.54	−74.54		15.98	−15.95
$12^{h}\ 45^{m}\ 37^{s}.397$			$14^{h}\ 12^{m}\ 41^{s}.586$			$18^{h}\ 3^{m}\ 13^{s}.216$			$19^{h}\ 19^{m}\ 42^{s}.17$			$22^{h}\ 15^{m}\ 6^{s}.74$		
−84° 38′ 44″.23			−83° 15′ 57″.15			−87° 39′ 53″.25			−89° 14′ 4″.37			−86° 24′ 57″.52		

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

ι Octantis. Mag. 5.4			**δ Octantis.** Mag. 4.1			**χ Octantis.** Mag. 5.2			**σ Octantis.** Mag. 5.5			**υ Octantis.** Mag. 5.7		
n r e.	**Right Ascension.**	**Declination** ***South.***	**Mean Solar Date.**	**Right Ascension.**	**Declination** ***South.***	**Mean Solar Date.**	**Right Ascension.**	**Declination** ***South.***	**Mean Solar Date.**	**Right Ascension.**	**Declination** ***South.***	**Mean Solar Date.**	**Right Ascension.**	**Declination** ***South.***
	h m	° ′		h m	° ′		h m	° ′		h m	° ′		h m	° ′
y	12 45	−84 39	May	14 12	−83 16	May	18 3	−87 39	May	19 20	−89 13	May	22 15	−86 24
	s	″		s	″		s	″		s	″		s	″
4	44.32	0.62	1.5	50.18	9.35	1.6	42.04	47.84	1.7	54.82	53.38	1.8	10.35	39.89
4	44.26	0.97	2.5	50.22	9.70	2.6	42.60	47.99	2.7	56.64	53.41	2.8	10.67	39.66
4	44.19	1.33	3.5	50.25	10.07	3.6	43.16	48.16	3.7	58.53	53.45	3.8	11.01	39.41
4	44.12	1.70	4.5	50.27	10.44	4.6	43.74	48.35	4.7	60.47	53.51	4.8	11.37	39.17
4	44.03	2.06	5.5	50.28	10.82	5.6	44.30	48.55	5.7	62.41	53.60	5.8	11.74	38.96
4	43.92	2.42	6.5	50.28	11.20	6.6	44.84	48.79	6.7	64.33	53.70	6.8	12.12	38.77
4	43.80	2.76	7.5	50.27	11.59	7.6	45.37	49.04	7.7	66.22	53.82	7.8	12.51	38.60
4	43.67	3.09	8.5	50.25	11.97	8.6	45.86	49.29	8.7	68.04	53.96	8.8	12.90	38.45
4	43.54	3.41	9.5	50.23	12.33	9.6	46.33	49.54	9.7	69.78	54.10	9.8	13.28	38.32
4	43.40	3.70	10.5	50.20	12.68	10.6	46.76	49.79	10.7	71.42	54.25	10.8	13.65	38.20
4	43.27	3.98	11.5	50.17	13.01	11.6	47.18	50.03	11.7	72.98	54.39	11.8	14.01	38.09
4	43.15	4.24	12.5	50.14	13.31	12.6	47.58	50.26	12.7	74.49	54.52	12.8	14.35	37.97
4	43.04	4.50	13.5	50.11	13.61	13.6	47.98	50.47	13.7	75.96	54.64	13.8	14.67	37.85
4	42.94	4.77	14.4	50.09	13.91	14.6	48.40	50.66	14.7	77.44	54.75	14.8	14.98	37.72
4	42.85	5.05	15.4	50.09	14.21	15.6	48.84	50.84	15.7	78.99	54.84	15.8	15.30	37.56
4	42.77	5.34	16.4	50.09	14.54	16.6	49.30	51.03	16.7	80.65	54.93	16.8	15.64	37.39
4	42.68	5.65	17.4	50.09	14.88	17.6	49.80	51.23	17.7	82.40	55.03	17.8	16.00	37.22
4	42.57	5.98	18.4	50.09	15.24	18.6	50.31	51.45	18.7	84.24	55.15	18.8	16.38	37.05
4	42.44	6.31	19.4	50.07	15.62	19.6	50.82	51.70	19.6	86.12	55.30	19.8	16.78	36.89
4	42.28	6.63	20.4	50.03	16.01	20.6	51.31	51.98	20.6	87.96	55.48	20.8	17.21	36.75
4	42.11	6.94	21.4	49.97	16.38	21.6	51.76	52.28	21.6	89.73	55.68	21.8	17.64	36.65
4	41.93	7.23	22.4	49.91	16.73	22.6	52.16	52.58	22.6	91.38	55.89	22.8	18.06	35.58
4	41.76	7.49	23.4	49.84	17.06	23.6	52.50	52.89	23.6	92.88	56.11	23.8	18.46	36.54
4	41.59	7.73	24.4	49.77	17.36	24.6	52.82	53.18	24.6	94.25	56.32	24.8	18.83	36.49
4	41.44	7.94	25.4	49.70	17.64	25.6	53.13	53.44	25.6	95.54	56.51	25.8	19.17	36.44
4	41.30	8.15	26.4	49.65	17.90	26.6	53.44	53.69	26.6	96.80	56.68	26.7	19.50	36.38
4	41.17	8.36	27.4	49.61	18.17	27.6	53.76	53.92	27.6	98.08	56.83	27.7	19.82	36.32
3	41.05	8.58	28.4	49.57	18.45	28.6	54.09	54.14	28.6	99.41	56.97	28.7	20.15	36.24
3	40.92	8.83	29.4	49.53	18.74	29.6	54.44	54.37	29.6	100.80	57.11	29.7	20.49	36.14
3	40.78	9.08	30.4	49.49	19.04	30.6	54.82	54.61	30.6	102.25	57.26	30.7	20.85	36.04
3	40.64	9.33	31.4	49.44	19.35	31.6	55.20	54.88	31.6	103.77	57.43	31.7	21.23	35.95
3	40.49	9.58	32.4	49.38	19.68	32.6	55.57	55.16	32.6	105.29	57.61	32.7	21.62	35.88
10.73	−10.68			8.53	−8.47		24.54	−24.52		74.61	−74.60		15.97	−15.94
$2^h\ 45^m\ 37^s.397$			$14^h\ 12^m\ 41^s.586$			$18^h\ 3^m\ 13^s.216$			$19^h\ 19^m\ 42^s.17$			$22^h\ 15^m\ 6^s.74$		
4° 38′ 44″.23			−83° 15′ 57″.15			−87° 39′ 53″.25			−89° 14′ 4″.37			−86° 24′ 57″.52		

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

ι Octantis. Mag. 5.4			**δ Octantis.** Mag. 4.1			**χ Octantis.** Mag. 5.2			**σ Octantis.** Mag. 5.5			**υ Octantis.** Mag. 5.7		
Mean Solar Date.	**Right Ascension.**	**Declination *South*.**	**Mean Solar Date.**	**Right Ascension.**	**Declination *South*.**	**Mean Solar Date.**	**Right Ascension.**	**Declination *South*.**	**Mean Solar Date.**	**Right Ascension.**	**Declination *South*.**	**Mean Solar Date.**	**Right Ascension.**	**Declination *South*.**
	h m	° ′		h m	° ′		h m	° ′		h m	° ′		h m	° ′
June	12 45	−84 39	June	14 12	−83 16	June	18 3	−87 39	June	19 21	−89 13	June	22 15	−86 24
	s	″		s	″		s	″		s	″		s	″
1.3	40.49	9.58	1.4	49.38	19.68	1.6	55.57	55.16	1.6	45.29	57.61	1.7	21.62	35.88
2.3	40.32	9.83	2.4	49.31	20.01	2.6	55.93	55.45	2.6	46.81	57.82	2.7	22.02	35.82
3.3	40.13	10.08	3.4	49.23	20.34	3.6	56.26	55.76	3.6	48.28	58.05	3.7	22.43	35.78
4.3	39.94	10.31	4.4	49.14	20.65	4.5	56.57	56.08	4.6	49.68	58.30	4.7	22.84	35.76
5.3	39.75	10.51	5.4	49.04	20.95	5.5	56.85	56.41	5.6	50.99	58.57	5.7	23.25	35.77
6.3	39.55	10.70	6.4	48.93	21.23	6.5	57.09	56.74	6.6	52.21	58.85	6.7	23.64	35.79
7.3	39.34	10.87	7.4	48.83	21.50	7.5	57.30	57.06	7.6	53.33	59.12	7.7	24.01	35.82
8.3	39.14	11.02	8.4	48.73	21.74	8.5	57.49	57.36	8.6	54.38	59.38	8.7	24.36	35.85
9.3	38.96	11.16	9.4	48.64	21.96	9.5	57.67	57.64	9.6	55.38	59.62	9.7	24.69	35.87
10.3	38.79	11.30	10.4	48.56	22.18	10.5	57.86	57.90	10.6	56.36	59.83	10.7	25.00	35.90
11.3	38.64	11.45	11.4	48.48	22.40	11.5	58.07	58.15	11.6	57.38	60.03	11.7	25.31	35.91
12.3	38.50	11.62	12.4	48.41	22.64	12.5	58.31	58.40	12.6	58.47	60.22	12.7	25.63	35.90
13.3	38.35	11.80	13.4	48.34	22.90	13.5	58.58	58.66	13.6	59.66	60.41	13.7	25.96	35.87
14.3	38.19	12.01	14.4	48.27	23.18	14.5	58.87	58.93	14.6	60.94	60.62	14.7	26.32	35.84
15.3	38.01	12.22	15.4	48.19	23.46	15.5	59.17	59.23	15.6	62.28	60.85	15.7	26.71	35.82
16.3	37.80	12.42	16.4	48.09	23.76	16.5	59.45	59.56	16.6	63.59	61.11	16.7	27.12	35.82
17.3	37.57	12.62	17.4	47.97	24.05	17.5	59.68	59.91	17.6	64.84	61.39	17.7	27.54	35.85
18.3	37.34	12.80	18.4	47.84	24.32	18.5	59.87	60.27	18.6	65.97	61.70	18.7	27.95	35.90
19.3	37.11	12.93	19.3	47.70	24.56	19.5	60.01	60.62	19.6	66.95	62.01	19.7	28.34	35.98
20.3	36.88	13.04	20.3	47.56	24.78	20.5	60.11	60.96	20.6	67.79	62.31	20.7	28.71	36.08
21.3	36.67	13.13	21.3	47.43	24.98	21.5	60.19	61.28	21.6	68.52	62.59	21.7	29.05	36.19
22.3	36.48	13.21	22.3	47.31	25.16	22.5	60.26	61.58	22.6	69.18	62.86	22.7	29.36	36.28
23.3	36.30	13.29	23.3	47.19	25.32	23.5	60.33	61.86	23.6	69.85	63.11	23.7	29.65	36.36
24.3	36.12	13.37	24.3	47.09	25.47	24.5	60.42	62.13	24.5	70.55	63.35	24.7	29.93	36.43
25.3	35.95	13.45	25.3	46.99	25.64	25.5	60.53	62.39	25.5	71.30	63.58	25.7	30.23	36.49
26.3	35.78	13.55	26.3	46.90	25.83	26.5	60.66	62.65	26.5	72.10	63.82	26.7	30.55	36.55
27.3	35.60	13.67	27.3	46.79	26.04	27.5	60.80	62.93	27.5	72.96	64.07	27.7	30.87	36.61
28.3	35.41	13.80	28.3	46.67	26.25	28.5	60.94	63.24	28.5	73.85	64.33	28.7	31.21	36.68
29.3	35.20	13.91	29.3	46.55	26.46	29.5	61.06	63.56	29.5	74.73	64.61	29.7	31.57	36.76
30.3	34.99	14.01	30.3	46.41	26.68	30.5	61.15	63.89	30.5	75.56	64.91	30.7	31.94	36.86
31.3	34.76	14.10	31.3	46.26	26.89	31.5	61.22	64.23	31.5	76.33	65.23	31.7	32.30	36.99
	10.73	−10.69		8.54	−8.48		24.56	−24.54		74.77	−74.76		15.97	−15.94
12^h 45^m $37^s.397$			14^h 12^m $41^s.586$			18^h 3^m $13^s.216$			19^h 19^m $42^s.17$			22^h 15^m $6^s.74$		
−84° 38′ 44″.23			−83° 15′ 57″.15			−87° 39′ 53″.25			−89° 14′ 4″.37			−86° 24′ 57″.52		

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

ι Octantis. Mag. 5.4			δ Octantis. Mag. 4.1			χ Octantis. Mag. 5.2			σ Octantis. Mag. 5.5			υ Octantis. Mag. 5.7		
	Right Ascension.	Declination *South*.	Mean Solar Date.	Right Ascension.	Declination *South*.	Mean Solar Date.	Right Ascension.	Declination *South*.	Mean Solar Date.	Right Ascension.	Declination *South*.	Mean Solar Date.	Right Ascension.	Declination *South*.
	h m	° ′		h m	° ′		h m	° ′		h m	° ′		h m	° ′
July	12 45	−84 39	July	14 12	−83 16	July	18 3	−87 40	July	19 22	−89 14	July	22 15	−86 24
	s	″		s	″		s	″		s	″		s	″
1.3	34.76	14.10	1.3	46.26	26.89	1.5	61.22	4.23	1.5	16.33	5.23	1.7	32.30	36.99
2.3	34.52	14.17	2.3	46.10	27.08	2.5	61.25	4.58	2.5	17.01	5.56	2.6	32.65	37.14
3.2	34.28	14.22	3.3	45.94	27.24	3.5	61.25	4.93	3.5	17.59	5.90	3.6	32.99	37.30
4.2	34.04	14.25	4.3	45.77	27.39	4.5	61.22	5.27	4.5	18.06	6.23	4.6	33.31	37.47
5.2	33.81	14.27	5.3	45.61	27.52	5.5	61.16	5.60	5.5	18.43	6.55	5.6	33.61	37.64
6.2	33.60	14.27	6.3	45.46	27.63	6.5	61.10	5.91	6.5	18.72	6.85	6.6	33.89	37.81
7.2	33.40	14.26	7.3	45.32	27.73	7.5	61.03	6.19	7.5	18.98	7.14	7.6	34.15	37.97
8.2	33.21	14.26	8.3	45.20	27.83	8.5	60.98	6.45	8.5	19.26	7.41	8.6	34.40	38.12
9.2	33.03	14.27	9.3	45.09	27.92	9.5	60.96	6.71	9.5	19.59	7.66	9.6	34.64	38.26
10.2	32.86	14.29	10.3	44.97	28.03	10.4	60.96	6.97	10.5	20.01	7.91	10.6	34.89	38.38
11.2	32.68	14.34	11.3	44.85	28.16	11.4	60.99	7.24	11.5	20.52	8.17	11.6	35.17	38.49
12.2	32.49	14.40	12.3	44.73	28.32	12.4	61.03	7.53	12.5	21.10	8.44	12.6	35.48	38.60
13.2	32.28	14.45	13.3	44.59	28.49	13.4	61.06	7.84	13.5	21.69	8.74	13.6	35.80	38.73
14.2	32.06	14.49	14.3	44.44	28.65	14.4	61.06	8.18	14.5	22.24	9.06	14.6	36.13	38.88
15.2	31.82	14.51	15.3	44.27	28.80	15.4	61.01	8.53	15.5	22.70	9.40	15.6	36.45	39.06
16.2	31.57	14.51	16.3	44.09	28.92	16.4	60.92	8.88	16.5	23.01	9.76	16.6	36.77	39.27
17.2	31.33	14.49	17.3	43.89	29.02	17.4	60.79	9.21	17.5	23.17	10.10	17.6	37.07	39.49
18.2	31.10	14.43	18.3	43.71	29.09	18.4	60.63	9.52	18.5	23.20	10.44	18.6	37.33	39.73
19.2	30.88	14.36	19.3	43.55	29.14	19.4	60.43	9.81	19.5	23.14	10.76	19.6	37.56	39.96
20.2	30.68	14.28	20.3	43.40	29.17	20.4	60.23	10.07	20.5	23.05	11.06	20.6	37.76	40.18
21.2	30.49	14.20	21.3	43.26	29.20	21.4	60.07	10.32	21.5	22.97	11.33	21 6	37.96	40.38
22.2	30.31	14.13	22.3	43.12	29.22	22.4	59.92	10.56	22.5	22.95	11.59	22.6	38.15	40.57
23.2	30.14	14.07	23.3	42.98	29.26	23.4	59.80	10.81	23.5	22.99	11.84	23.6	38.35	40.75
24.2	29.96	14.03	24.3	42.84	29.31	24.4	59.68	11.06	24.5	23.06	12.10	24.6	38.57	40.94
25.2	29.78	13.99	25.3	42.70	29.37	25.4	59.56	11.32	25.5	23.15	12.38	25.6	38.80	41.13
26.2	29.58	13.95	26.2	42.55	29.44	26.4	59.43	11.61	26.5	23.23	12.68	26.6	39.04	41.33
27.2	29.37	13.90	27.2	42.39	29.52	27.4	59.28	11.91	27.5	23.29	12.99	27.6	39.29	41.55
28.2	29.15	13.84	28.2	42.21	29.59	28.4	59.11	12.22	28.5	23.28	13.31	28.6	39.53	41.79
29.2	28.92	13.77	29.2	42.03	29.64	29.4	58.91	12.53	29.5	23.19	13.65	29.6	39.76	42.04
30.2	28.69	13.68	30.2	41.84	29.68	30.4	58.67	12.84	30.4	23.01	14.00	30.6	39.99	42.31
31.2	28.47	13.56	31.2	41.65	29.70	31.4	58.41	13.13	31.4	22.72	14.35	31.6	40.21	42.60
32.2	28.26	13.42	32.2	41.46	29.68	32.4	58.12	13.41	32.4	22.34	14.68	32.6	40.40	42.89
	10.73	−10.69		8.54	−8.48		24.59	−24.57		74.98	−74.98		15.97	−15.94
	$12^h\ 45^m\ 37^s.397$			$14^h\ 12^m\ 41^s.586$			$18^h\ 3^m\ 13^s.216$			$19^h\ 19^m\ 42^s.17$			$22^h\ 15^m\ 6^s.74$	
	−84° 38′ 44″.23			−83° 15′ 57″.15			−87° 39′ 53″.25			−89° 14′ 4″.37			−86° 24′ 57″.52	

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

ι Octantis. Mag. 5.4			**δ Octantis.** Mag. 4.1			**χ Octantis.** Mag. 5.2			**σ Octantis.** Mag. 5.5			**υ Octantis.** Mag. 5.7		
Mean Solar Date.	**Right Ascension.**	**Declination *South.***	**Mean Solar Date.**	**Right Ascension.**	**Declination *South.***	**Mean Solar Date.**	**Right Ascension.**	**Declination *South.***	**Mean Solar Date.**	**Right Ascension.**	**Declination *South.***	**Mean Solar Date.**	**Right Ascension.**	**Declination *South.***
	h m	° ′		h m	° ′		h m	° ′		h m	° ′		h m	° ′
Aug.	12 45	−84 39	Aug.	14 12	−83 16	Aug.	18 3	−87 40	Aug.	19 22	−89 14	Aug.	22 15	−86 24
	s	″		s	″		s	″		s	″		s	″
1.2	28.26	13.42	1.2	41.46	29.68	1.4	58.12	13.41	1.4	22.34	14.68	1.6	40.40	42.89
2.2	28.05	13.27	2.2	41.28	29.64	2.4	57.81	13.67	2.4	21.87	14.99	2.6	40.56	43.18
3.2	27.86	13.12	3.2	41.11	29.59	3.4	57.49	13.90	3.4	21.34	15.28	3.6	40.70	43.45
4.2	27.69	12.96	4.2	40.95	29.52	4.4	57.17	14.12	4.4	20.81	15.55	4.6	40.83	43.70
5.2	27.53	12.81	5.2	40.80	29.46	5.4	56.89	14.33	5.4	20.34	15.80	5.6	40.95	43.94
6.2	27.38	12.68	6.2	40.66	29.43	6.4	56.64	14.53	6.4	19.94	16.04	6.6	41.07	44.17
7.2	27.22	12.56	7.2	40.53	29.41	7.4	56.41	14.72	7.4	19.62	16.29	7.5	41.21	44.38
8.2	27.05	12.46	8.2	40.39	29.41	8.4	56.20	14.94	8.4	19.38	16.55	8.5	41.37	44.58
9.1	26.88	12.37	9.2	40.25	29.42	9.4	56.00	15.19	9.4	19.19	16.82	9.5	41.55	44.80
10.1	26.70	12.27	10.2	40.10	29.43	10.4	55.77	15.45	10.4	18.98	17.11	10.5	41.74	45.04
11.1	26.49	12.15	11.2	39.93	29.44	11.4	55.51	15.72	11.4	18.68	17.42	11.5	41.93	45.31
12.1	26.28	12.01	12.2	39.75	29.42	12.4	55.22	15.99	12.4	18.25	17.74	12.5	42.11	45.61
13.1	26.07	11.84	13.2	39.56	29.37	13.4	54.87	16.26	13.4	17.67	18.07	13.5	42.27	45.93
14.1	25.87	11.64	14.2	39.38	29.29	14.4	54.49	16.51	14.4	16.96	18.39	14.5	42.40	46.25
15.1	25.69	11.43	15.2	39.20	29.18	15.4	54.09	16.73	15.4	16.15	18.68	15.5	42.49	46.57
16.1	25.52	11.21	16.2	39.03	29.06	16.3	53.67	16.92	16.4	15.27	18.95	16.5	42.55	46.88
17.1	25.37	10.99	17.2	38.87	28.93	17.3	53.27	17.09	17.4	14.39	19.19	17.5	42.59	47.18
18.1	25.24	10.78	18.2	38.73	28.81	18.3	52.89	17.24	18.4	13.55	19.41	18.5	42.63	47.46
19.1	25.12	10.58	19.2	38.60	28.70	19.3	52.54	17.38	19.4	12.77	19.62	19.5	42.68	47.72
20.1	24.99	10.39	20.2	38.48	28.60	20.3	52.20	17.53	20.4	12.06	19.84	20.5	42.74	47.97
21.1	24.85	10.22	21.2	38.35	28.51	21.3	51.87	17.69	21.4	11.40	20.07	21.5	42.81	48.22
22.1	24.71	10.05	22.2	38.21	28.42	22.3	51.55	17.87	22.4	10.75	20.31	22.5	42.90	48.48
23.1	24.56	9.87	23.2	38.06	28.34	23.3	51.20	18.06	23.4	10.07	20.57	23.5	42.99	48.75
24.1	24.39	9.68	24.2	37.90	28.25	24.3	50.84	18.26	24.4	9.35	20.84	24.5	43.08	49.04
25.1	24.21	9.48	25.2	37.74	28.15	25.3	50.45	18.47	25.4	8.56	21.12	25.5	43.16	49.34
26.1	24.04	9.26	26.2	37.57	28.04	26.3	50.02	18.67	26.4	7.67	21.39	26.5	43.23	49.66
27.1	23.88	9.02	27.2	37.39	27.91	27.3	49.57	18.87	27.4	6.67	21.67	27.5	43.29	50.00
28.1	23.72	8.77	28.2	37.22	27.76	28.3	49.09	19.05	28.4	5.58	21.94	28.5	43.32	50.34
29.1	23.57	8.49	29.2	37.05	27.58	29.3	48.59	19.21	29.4	4.41	22.20	29.5	43.33	50.68
30.1	23.44	8.20	30.2	36.89	27.38	30.3	48.09	19.34	30.4	3.17	22.43	30.5	43.31	51.00
31.1	23.32	7.91	31.1	36.75	27.18	31.3	47.60	19.45	31.4	1.92	22.63	31.5	43.27	51.31
32.1	23.22	7.64	32.1	36.63	26.98	32.3	47.13	19.54	32.4	0.71	22.82	32.5	43.22	51.61
	10.73	−10.68		8.54	−8.48		24.61	−24.59		75.23	−75.23		15.98	−15.95
$12^h\ 45^m\ 37^s.397$			$14^h\ 12^m\ 41^s.586$			$18^h\ 3^m\ 13^s.216$			$19^h\ 19^m\ 42^s.17$			$22^h\ 15^m\ 6^s.74$		
−84° 38′ 44″.23			−83° 15′ 57″.15			−87° 39′ 53″.25			−89° 14′ 4″.37			−86° 24′ 57″.52		

[Eph 12]

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

ι Octantis. Mag. 5.4			**δ Octantis.** Mag. 4.1			**χ Octantis.** Mag. 5.2			**σ Octantis.** Mag. 5.5			**υ Octantis.** Mag. 5.7		
Mean Solar Date.	Right Ascension.	Declination *South.*	Mean Solar Date.	Right Ascension.	Declination *South.*	Mean Solar Date.	Right Ascension.	Declination *South.*	Mean Solar Date.	Right Ascension.	Declination *South.*	Mean Solar Date.	Right Ascension.	Declination *South.*
	h m	° ′		h m	° ′		h m	° ′		h m	° ′		h m	° ′
Sept.	12 45	−84 38	Sept.	14 12	−83 16	Sept.	18 3	−87 40	Sept.	19 21	−89 14	Sept.	22 15	−86 24
	s	″		s	″		s	″		s	″		s	″
1.1	23.22	67.64	1.1	36.63	26.98	1.3	47.13	19.54	1.4	60.71	22.82	1.5	43.22	51.61
2.1	23.13	67.38	2.1	36.51	26.78	2.3	46.69	19.62	2.4	59.56	22.99	2.5	43.16	51.89
3.1	23.05	67.14	3.1	36.40	26.60	3.3	46.27	19.70	3.4	58.50	23.15	3.5	43.12	52.15
4.1	22.97	66.91	4.1	36.30	26.43	4.3	45.89	19.79	4.4	57.53	23.31	4.5	43.11	52.39
5.1	22.88	66.69	5.1	36.19	26.29	5.3	45.52	19.90	5.3	56.62	23.48	5.5	43.11	52.64
6.1	22.77	66.48	6.1	36.07	26.16	6.3	45.14	20.02	6.3	55.72	23.67	6.5	43.12	52.91
7.1	22.65	66.26	7.1	35.93	26.03	7.3	44.74	20.15	7.3	54.77	23.88	7.5	43.15	53.20
8.1	22.52	66.02	8.1	35.78	25.88	8.3	44.30	20.30	8.3	53.72	24.11	8.5	43.17	53.51
9.1	22.39	65.76	9.1	35.63	25.71	9.3	43.82	20.44	9.3	52.56	24.35	9.5	43.16	53.84
10.1	22.27	65.48	10.1	35.48	25.50	10.3	43.31	20.56	10.3	51.27	24.57	10.5	43.12	54.18
11.1	22.16	65.18	11.1	35.34	25.26	11.3	42.77	20.66	11.3	49.86	24.77	11.5	43.05	54.52
12.1	22.07	64.87	12.1	35.22	25.00	12.3	42.23	20.72	12.3	48.39	24.94	12.5	42.95	54.85
13.1	22.00	64.55	13.1	35.11	24.74	13.3	41.70	20.76	13.3	46.89	25.08	13.4	42.83	55.16
14.0	21.95	64.24	14.1	35.01	24.48	14.3	41.19	20.78	14.3	45.44	25.20	14.4	42.69	55.44
15.0	21.91	63.95	15.1	34.92	24.23	15.3	40.72	20.78	15.3	44.06	25.30	15.4	42.56	55.70
16.0	21.88	63.67	16.1	34.84	24.00	16.3	40.26	20.79	16.3	42.76	25.39	16.4	42.44	55.94
17.0	21.84	63.40	17.1	34.76	23.78	17.3	39.82	20.80	17.3	41.52	25.49	17.4	42.33	56.18
18.0	21.80	63.14	18.1	34.67	23.56	18.3	39.39	20.83	18.3	40.31	25.60	18.4	42.23	56.42
19.0	21.75	62.89	19.1	34.57	23.35	19.3	38.95	20.87	19.3	39.11	25.74	19.4	42.14	56.68
20.0	21.69	62.63	20.1	34.46	23.15	20.3	38.50	20.92	20.3	37.88	25.89	20.4	42.06	56.95
21.0	21.62	62.35	21.1	34.35	22.94	21.3	38.03	20.98	21.3	36.58	26.05	21.4	41.98	57.24
22.0	21.54	62.06	22.1	34.24	22.71	22.2	37.53	21.03	22.3	35.21	26.20	22.4	41.89	57.55
23.0	21.47	61.75	23.1	34.13	22.47	23.2	37.01	21.07	23.3	33.75	26.35	23.4	41.79	57.87
24.0	21.41	61.43	24.1	34.02	22.21	24.2	36.46	21.10	24.3	32.21	26.49	24.4	41.66	58.19
25.0	21.36	61.08	25.1	33.92	21.93	25.2	35.90	21.12	25.3	30.59	26.62	25.4	41.51	58.50
26.0	21.32	60.74	26.1	33.82	21.63	26.2	35.33	21.11	26.3	28.90	26.72	26.4	41.33	58.80
27.0	21.31	60.40	27.1	33.74	21.32	27.2	34.77	21.07	27.3	27.19	26.80	27.4	41.12	59.08
28.0	21.32	60.07	28.1	33.67	21.00	28.2	34.22	21.01	28.3	25.51	26.85	28.4	40.90	59.34
29.0	21.33	59.75	29.1	33.62	20.69	29.2	33.71	20.94	29.3	23.90	26.88	29.4	40.67	59.58
30.0	21.35	59.45	30.1	33.58	20.41	30.2	33.24	20.86	30.3	22.38	26.90	30.4	40.46	59.80
31.0	21.37	59.16	31.1	33.55	20.15	31.2	32.80	20.78	31.3	20.97	26.91	31.4	40.26	60.00
	10.73	−10.68		8.54	−8.48		24.62	−24.60		75.42	−75.42		15.99	−15.96
$12^h\ 45^m\ 37^s.397$			$14^h\ 12^m\ 41^s.586$			$18^h\ 3^m\ 13^s.216$			$19^h\ 19^m\ 42^s.17$			$22^h\ 15^m\ 6^s.74$		
−84° 38′ 44″.23			−83° 15′ 57″.15			−87° 39′ 53″.25			−89° 14′ 4″.37			−86° 24′ 57″.52		

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

ι Octantis. Mag. 5.4			δ Octantis. Mag. 4.1			χ Octantis. Mag. 5.2			σ Octantis. Mag. 5.5			υ Octantis. Mag. 5.7		
Mean Solar Date.	Right Ascension.	Declination *South.*	Mean Solar Date.	Right Ascension.	Declination *South.*	Mean Solar Date.	Right Ascension.	Declination *South.*	Mean Solar Date.	Right Ascension.	Declination *South.*	Mean Solar Date.	Right Ascension.	Declination *South.*
	h m	° ′		h m	° ′		h m	° ′		h m	° ′		h m	° ′
Oct.	12 45	−84 38	Oct.	14 12	−83 16	Oct.	18 3	−87 40	Oct.	19 20	−89 14	Oct.	22 15	−86 25
	s	″		s	″		s	″		s	″		s	″
1.0	21.37	59.16	1.1	33.55	20.15	1.2	32.80	20.78	1.3	80.97	26.91	1.4	40.26	0.00
2.0	21.39	58.90	2.1	33.51	19.90	2.2	32.39	20.71	2.3	79.67	26.94	2.4	40.08	0.20
2.9	21.40	58.64	3.1	33.46	19.66	3.2	31.98	20.67	3.3	78.42	26.98	3.4	39.93	0.41
3.9	21.41	58.40	4.1	33.40	19.43	4.2	31.55	20.64	4.3	77.13	27.05	4.4	39.79	0.64
4.9	21.40	58.13	5.1	33.33	19.20	5.2	31.10	20.62	5.3	75.80	27.13	5.4	39.64	0.88
5.9	21.39	57.85	6.1	33.25	18.95	6.2	30.63	20.59	6.3	74.35	27.21	6.4	39.48	1.14
6.9	21.38	57.55	7.0	33.18	18.67	7.2	30.12	20.56	7.3	72.79	27.28	7.4	39.30	1.41
7.9	21.38	57.22	8.0	33.12	18.37	8.2	29.58	20.50	8.3	71.12	27.32	8.4	39.08	1.68
8.9	21.40	56.86	9.0	33.07	18.04	9.2	29.03	20.42	9.3	69.38	27.34	9.4	38.83	1.94
9.9	21.43	56.52	10.0	33.03	17.69	10.2	28.51	20.31	10.3	67.61	27.34	10.4	38.56	2.18
10.9	21.49	56.19	11.0	33.00	17.35	11.2	28.00	20.17	11.2	65.89	27.31	11.4	38.28	2.40
11.9	21.57	55.87	12.0	32.99	17.03	12.2	27.53	20.01	12.2	64.25	27.26	12.4	38.00	2.58
12.9	21.66	55.57	13.0	32.99	16.73	13.2	27.08	19.85	13.2	62.71	27.19	13.4	37.72	2.74
13.9	21.75	55.29	14.0	33.00	16.44	14.2	26.67	19.70	14.2	61.25	27.13	14.4	37.45	2.90
14.9	21.83	55.02	15.0	33.00	16.16	15.2	26.27	19.56	15.2	59.86	27.09	15.4	37.21	3.06
15.9	21.90	54.77	16.0	32.99	15.90	16.2	25.87	19.44	16.2	58.48	27.06	16.4	36.98	3.23
16.9	21.96	54.51	17.0	32.98	15.65	17.2	25.47	19.32	17.2	57.12	27.03	17.4	36.76	3.40
17.9	22.02	54.24	18.0	32.97	15.39	18.2	25.05	19.21	18.2	55.74	27.01	18.4	36.54	3.58
18.9	22.08	53.96	19.0	32.95	15.11	19.2	24.62	19.10	19.2	54.28	27.00	19.4	36.31	3.78
19.9	22.13	53.68	20.0	32.92	14.81	20.2	24.17	18.99	20.2	52.77	26.98	20.3	36.07	3.99
20.9	22.18	53.39	21.0	32.90	14.50	21.2	23.71	18.87	21.2	51.19	26.96	21.3	35.82	4.20
21.9	22.25	53.08	22.0	32.89	14.19	22.2	23.23	18.73	22.2	49.54	26.93	22.3	35.54	4.40
22.9	22.33	52.76	23.0	32.89	13.87	23.2	22.74	18.57	23.2	47.84	26.87	23.3	35.24	4.60
23.9	22.43	52.44	24.0	32.89	13.53	24.2	22.27	18.39	24.2	46.11	26.79	24.3	34.92	4.78
24.9	22.55	52.13	24.9	32.91	13.18	25.2	21.81	18.17	25.2	44.41	26.68	25.3	34.58	4.93
25.9	22.68	51.84	25.9	32.95	12.85	26.2	21.38	17.94	26.2	42.77	26.55	26.3	34.24	5.05
26.9	22.82	51.57	26.9	33.00	12.52	27.2	21.00	17.70	27.2	41.23	26.40	27.3	33.91	5.15
27.9	22.98	51.32	27.9	33.05	12.22	28.1	20.66	17.47	28.2	39.80	26.24	28.3	33.59	5.22
28.9	23.12	51.09	28.9	33.11	11.94	29.1	20.35	17.25	29.2	38.51	26.09	29.3	33.29	5.28
29.9	23.25	50.88	29.9	33.16	11.68	30.1	20.05	17.04	30.2	37.30	25.95	30.3	33.02	5.34
30.9	23.37	50.68	30.9	33.21	11.44	31.1	19.75	16.85	31.2	36.13	25.83	31.3	32.76	5.42
31.9	23.48	50.47	31.9	33.25	11.19	32.1	19.44	16.68	32.2	34.95	25.73	32.3	32.51	5.53
32.9	23.59	50.24	32.9	33.28	10.93	33.1	19.10	16.51	33.2	33.68	25.64	33.3	32.25	5.66
10.72	−10.68		8.53	−8.47		24.62	−24.60		75.48	−75.48		16.00	−15.97	
$12^h\ 45^m\ 37^s.397$			$14^h\ 12^m\ 41^s.586$			$18^h\ 3^m\ 13^s.216$			$19^h\ 19^m\ 42^s.17$			$22^h\ 15^m\ 6^s.74$		
−84° 38′ 44″.23			−83° 15′ 57″.15			−87° 39′ 53″.25			−89° 14′ 4″.37			−86° 24′ 57″.52		

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

ι Octantis. Mag. 5.4			**δ Octantis.** Mag. 4.1			**χ Octantis.** Mag. 5.2			**σ Octantis.** Mag. 5.5			**υ Octantis.** Mag. 5.7		
ean olar ate.	**Right Ascension.**	**Declination *South*.**	**Mean Solar Date.**	**Right Ascension.**	**Declination *South*.**	**Mean Solar Date.**	**Right Ascension.**	**Declination *South*.**	**Mean Solar Date.**	**Right Ascension.**	**Declination *South*.**	**Mean Solar Date.**	**Right Ascension.**	**Declination *South*.**
	h m	° ′		h m	° ′		h m	° ′		h m	° ′		h m	° ′
ov.	12 45	−84 38	Nov.	14 12	−83 16	Nov.	18 3	−87 40	Nov.	19 20	−89 14	Nov.	22 15	−86 25
	s	″		s	″		s	″		s	″		s	″
1.9	23.59	50.24	1.9	33.28	10.93	1.1	19.44	16.68	1.2	34.95	25.73	1.3	32.51	5.53
2.9	23.69	49.99	2.9	33.30	10.65	2.1	19.10	16.51	2.2	33.68	25.64	2.3	32.25	5.66
3.9	23.80	49.72	3.9	33.32	10.36	3.1	18.73	16.33	3.2	32.30	25.55	3.3	31.98	5.80
4.9	23.92	49.44	4.9	33.36	10.04	4.1	18.34	16.14	4.2	30.82	25.45	4.3	31.68	5.95
5.9	24.07	49.17	5.9	33.42	9.71	5.1	17.94	15.92	5.2	29.28	25.32	5.3	31.35	6.08
6.9	24.25	48.90	6.9	33.50	9.39	6.1	17.55	15.67	6.2	27.70	25.16	6.3	31.00	6.18
7.9	24.44	48.65	7.9	33.59	9.08	7.1	17.19	15.39	7.2	26.17	24.98	7.3	30.63	6.26
8.9	24.63	48.43	8.9	33.68	8.78	8.1	16.87	15.10	8.2	24.73	24.77	8.3	30.25	6.31
9.9	24.83	48.22	9.9	33.78	8.49	9.1	16.58	14.80	9.2	23.39	24.54	9.3	29.91	6.33
0.9	25.02	48.03	10.9	33.88	8.23	10.1	16.33	14.51	10.2	22.17	24.31	10.3	29.55	6.34
1.9	25.20	47.85	11.9	33.98	7.99	11.1	16.10	14.23	11.2	21.03	24.09	11.3	29.22	6.35
2.9	25.37	47.68	12.9	34.08	7.75	12.1	15.89	13.97	12.2	19.96	23.89	12.3	28.91	6.35
3.9	25.54	47.51	13.9	34.17	7.51	13.1	15.69	13.72	13.2	18.91	23.70	13.3	28.61	6.36
4.9	25.70	47.33	14.9	34.25	7.27	14.1	15.47	13.48	14.2	17.85	23.51	14.3	28.32	6.38
5.9	25.86	47.15	15.9	34.32	7.03	15.1	15.23	13.25	15.2	16.76	23.33	15.3	28.03	6.41
6.9	26.02	46.96	16.9	34.39	6.78	16.1	14.98	13.02	16.2	15.63	23.16	16.3	27.73	6.44
7.9	26.19	46.75	17.9	34.48	6.51	17.1	14.71	12.78	17.1	14.43	22.98	17.3	27.42	6.49
8.9	26.37	46.54	18.9	34.58	6.23	18.1	14.43	12.52	18.1	13.18	22.79	18.3	27.10	6.54
9.9	26.57	46.33	19.9	34.68	5.94	19.1	14.15	12.25	19.1	11.91	22.59	19.3	26.77	6.57
0.9	26.78	46.13	20.9	34.79	5.64	20.1	13.88	11.95	20.1	10.63	22.37	20.3	26.41	6.59
1.9	27.01	45.95	21.9	34.92	5.36	21.1	13.64	11.64	21.1	9.37	22.12	21.3	26.03	6.59
2.9	27.25	45.79	22.9	35.06	5.09	22.1	13.43	11.30	22.1	8.17	21.84	22.3	25.65	6.57
3.9	27.49	45.65	23.9	35.21	4.85	23.1	13.27	10.95	23.1	7.08	21.54	23.3	25.28	6.52
4.9	27.74	45.53	24.9	35.36	4.64	24.1	13.14	10.61	24.1	6.12	21.23	24.3	24.92	6.44
5.9	27.98	45.45	25.9	35.51	4.46	25.1	13.05	10.29	25.1	5.29	20.93	25.2	24.58	6.34
6.8	28.20	45.38	26.9	35.66	4.29	26.1	13.01	9.98	26.1	4.58	20.64	26.2	24.27	6.23
7.8	28.40	45.30	27.9	35.80	4.12	27.1	12.96	9.68	27.1	3.95	20.37	27.2	23.99	6.14
8.8	28.59	45.20	28.9	35.92	3.95	28.1	12.90	9.41	28.1	3.33	20.13	28.2	23.73	6.06
9.8	28.77	45.10	29.9	36.03	3.77	29.1	12.81	9.15	29.1	2.65	19.90	29.2	23.46	6.00
0.8	28.96	44.99	30.9	36.15	3.57	30.1	12.70	8.89	30.1	1.88	19.68	30.2	23.18	5.95
1.8	29.17	44.86	31.9	36.28	3.35	31.1	12.57	8.62	31.1	1.01	19.45	31.2	22.89	5.91
	10.72	−10.67		8.53	−8.47		24.60	−24.58		75.37	−75.37		16.01	−15.98
	$12^h\ 45^m$	$37^s.397$		$14^h\ 12^m$	$41^s.586$		$18^h\ 3^m$	$13^s.216$		$19^h\ 19^m$	$42^s.17$		$22^h\ 15^m$	$6^s.74$
	84° 38′	44″.23		−83° 15′	57″.15		−87° 39′	53″.25		−89° 14′	4″.37		−86° 24′	57″.52

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

ι Octantis.			**δ Octantis.**			**χ Octantis.**			**σ Octantis.**			**υ Octantis.**		
Mag. 5.4			Mag. 4.1			Mag. 5.2			Mag 5.5			Mag. 5.7		
Mean Solar Date.	**Right Ascension.**	**Declination *South.***	**Mean Solar Date.**	**Right Ascension.**	**Declination *South.***	**Mean Solar Date.**	**Right Ascension.**	**Declination *South.***	**Mean Solar Date.**	**Right Ascension.**	**Declination *South.***	**Mean Solar Date.**	**Right Ascension.**	**Declination *South.***
	h m	° ′		h m	° ′		h m	° ′		h m	° ′		h m	° ′
Dec.	12 45	−84 38	Dec.	14 12	−83 15	Dec.	18 3	−87 39	Dec.	19 19	−89 14	Dec.	22 15	−86 25
	s	″		s	″		s	″		s	″		s	″
1.8	29.17	44.86	1.9	36.28	63.35	1.1	12.57	68.62	1.1	61.01	19.45	1.2	22.89	5.91
2.8	29.39	44.72	2.9	36.42	63.12	2.1	12.43	68.32	2.1	60.07	19.20	2.2	22.57	5.86
3.8	29.64	44.58	3.9	36.57	62.88	3.1	12.28	68.00	3.1	59.09	18.92	3.2	22.22	5.79
4.8	29.90	44.46	4.9	36.74	62.65	4.0	12.16	67.65	4.1	58.12	18.61	4.2	21.85	5.70
5.8	30.17	44.37	5.9	36.92	62.44	5.0	12.08	67.29	5.1	57.24	18.28	5.2	21.47	5.59
6.8	30.44	44.31	6.9	37.10	62.25	6.0	12.04	66.92	6.1	56.51	17.94	6.2	21.11	5.45
7.8	30.71	44.27	7.9	37.29	62.09	7.0	12.03	66.56	7.1	55.90	17.59	7.2	20.76	5.29
8.8	30.97	44.24	8.9	37.47	61.94	8.0	12.07	66.21	8.1	55.41	17.25	8.2	20.44	5.12
9.8	31.21	44.22	9.9	37.65	61.80	9.0	12.13	65.87	9.1	55.00	16.92	9.2	20.15	4.94
10.8	31.44	44.22	10.9	37.82	61.68	10.0	12.20	65.55	10.1	54.64	16.60	10.2	19.88	4.77
11.8	31.67	44.21	11.9	37.98	61.56	11.0	12.26	65.24	11.1	54.30	16.30	11.2	19.62	4.62
12.8	31.90	44.18	12.9	38.14	61.43	12.0	12.31	64.94	12.1	53.93	16.02	12.2	19.35	4.48
13.8	32.12	44.14	13.9	38.30	61.30	13.0	12.35	64.66	13.1	53.54	15.75	13.2	19.09	4.35
14.8	32.34	44.10	14.9	38.45	61.16	14.0	12.38	64.38	14.1	53.10	15.48	14.2	18.83	4.22
15.8	32.57	44.06	15.9	38.61	61.01	15.0	12.39	64.08	15.1	52.60	15.20	15.2	18.56	4.09
16.8	32.81	44.01	16.9	38.78	60.85	16.0	12.39	63.76	16.1	52.06	14.90	16.2	18.27	3.95
17.8	33.06	43.97	17.9	38.97	60.68	17.0	12.40	63.43	17.1	51.50	14.58	17.2	17.97	3.80
18.8	33.33	43.94	18.8	39.17	60.52	18.0	12.43	63.09	18.1	50.97	14.24	18.2	17.65	3.64
19.8	33.62	43.93	19.8	39.38	60.38	19.0	12.48	62.73	19.1	50.50	13.89	19.2	17.32	3.46
20.8	33.91	43.94	20.8	39.60	60.26	20.0	12.58	62.36	20.1	50.14	13.52	20.2	17.00	3.25
21.8	34.20	43.98	21.8	39.82	60.17	21.0	12.71	61.98	21.1	49.90	13.13	21.2	16.70	3.01
22.8	34.48	44.05	22.8	40.04	60.10	21.9	12.89	61.61	22.1	49.81	12.74	22.2	16.41	2.75
23.8	34.75	44.14	23.8	40.25	60.06	22.9	13.11	61.26	23.0	49.88	12.36	23.2	16.15	2.48
24.8	35.01	44.24	24.8	40.45	60.04	23.9	13.36	60.94	24.0	50.05	12.01	24.2	15.92	2.21
25.8	35.24	44.33	25.8	40.64	60.02	24.9	13.61	60.65	25.0	50.26	11.69	25.2	15.71	1.90
26.8	35.46	44.41	26.8	40.82	59.99	25.9	13.85	60.37	26.0	50.44	11.38	26.2	15.51	1.73
27.8	35.67	44.47	27.8	40.99	59.94	26.9	14.05	60.11	27.0	50.54	11.08	27.2	15.32	1.52
28.8	35.90	44.52	28.8	41.17	59.87	27.9	14.23	59.84	28.0	50.56	10.78	28.2	15.12	1.33
29.8	36.14	44.56	29.8	41.36	59.80	28.9	14.38	59.55	29.0	50.48	10.47	29.2	14.89	1.12
30.8	36.39	44.60	30.8	41.56	59.72	29.9	14.53	59.23	30.0	50.34	10.15	30.2	14.64	0.91
31.8	36.67	44.65	31.8	41.77	59.63	30.9	14.69	58.90	31.0	50.21	9.80	31.2	14.37	0.68
32.8	36.96	44.71	32.8	41.99	59.53	31.9	14.88	58.55	32.0	50.15	9.43	32.1	14.09	0.42
	10.72	−10.67		8.53	−8.47		24.57	−24.55		75.15	−75.15		16.00	−15.97
	12h 45m 37s.397			14h 12m 41s.586			18h 3m 13s.216			19h 19m 42s.17			22h 15m 6s.74	
	−84° 38′ 44″.23			−83° 15′ 57″.15			−87° 39′ 53″.25			−89° 14′ 4″.37			−86° 24′ 57″.52	

N ERRORS OF NEWCOMB'S PLACES FOR 1920 OF STARS OF THE AMERICAN EPHEMERIS AND NAUTICAL ALMANAC.

Name.	R. A. 1912.		Decl. 1912.	Mean Error 1920.		Cat. No.	Name.	R. A. 1912.		Decl. 1912.	Mean Error 1920.	
				α	δ						α	δ
	h	m	°	s	″			h	m	°	s	″
33 Piscium	0	1	− 6	.018	.25	112	4 Octantis	1	42	−85	.039	.40
α Androm.		4	+29	.010	.13	116	ζ Ceti		47	−11	.020	.24
β Cassiop.		4	+59	.017	.17	117	ε Cassiop.		48	+63	.017	.17
ε Phœnicis		5	−46	.051	.41	118	α Trianguli		48	+29	.022	.22
22 Androm.		6	+46	.024	.28	120	ξ Piscium		49	+ 3	.018	.23
γ Pegasi	0	9	+15	.011	.14	121	β Arietis	1	50	+20	.013	.20
σ Androm.		14	+36	.029	.33	122	ψ Phœnicis		50	−47	.080	.81
ι Ceti		15	− 9	.014	.20	127	υ Ceti		56	−22	.025	.32
ζ Tucanæ		15	−65	.047	.38	126	50 Cassiop.		56	+72	.016	.17
44 Piscium		21	+ 1	.018	.22	129	α Hydri		56	−62	.049	.34
β Hydri	0	21	−78	....	...	131	γ Andr. *pr.*	1	58	+42	.016	.16
α Phœnicis		22	−43	.047	.31	133	α Arietis	2	2	+23	.010	.14
12 Ceti		26	− 4	.017	.21	134	β Triang.		4	+35	.018	.21
13 Ceti		31	− 4	.023	.30	136	55 Cassiop.		8	+66	.025	.24
ζ Cassiop.		32	+53	.021	.20	137	6 Persei		8	+51	.025	.27
π Androm.	0	32	+33	.021	.21	138	ξ¹ Ceti	2	8	+ 8	.018	.23
ε Androm.		34	+29	.016	.19	139	μ Fornacis		9	−31	.076	.83
δ Androm.		35	+30	.018	.22	141	γ Trianguli		12	+33	.024	.31
α Cassiop.		36	+56	.012	.14	142	67 Ceti		13	− 7	.021	.25
μ Phœnicis		37	−47	....	.53	144	φ Eridani		13	−52	.049	.42
β Ceti	0	39	−18	.013	.17	145	ο Ceti	2	15	− 3	.018	.23
ο Cassiop.		40	+48	.034	.26	146	κ Fornacis		19	−24	.049	.47
21 Cassiop.		40	+75	.017	.24	148	δ Hydri		20	−69	....	...
ζ Androm.		43	+24	.019	.24	149	ι Cassiop.		22	+67	.025	.25
η Cassiop.		44	+57	.017	.24	153	ξ² Ceti		23	+ 8	.014	.19
δ Piscium	0	44	+ 7	.014	.20	156	σ Ceti	2	28	−16	.028	.37
λ Hydri		46	−75	....	.70	157	36 H.Cassiop.		30	+72	.021	.22
20 Ceti		49	− 2	.018	.26	160	ν Ceti		31	+ 5	.020	.26
γ Cassiop.		51	+60	.018	.22	163	μ Hydri		34	−79	.056	.70
μ Androm.		52	+38	.017	.21	161	ν Arietis		34	+22	.020	.26
α Sculpt.	0	54	−30	.025	.23	165	δ Ceti	2	35	0	.014	.20
43 H. Cephei		57	+86	.010	.17	170	θ Persei		38	+49	.021	.19
ε Piscium	0	58	+ 7	.012	.26	172	ε Hydri		38	−69	....	...
β Phœnicis	1	2	−47	.050	.47	173	γ Ceti *seq.*		39	+ 3	.016	.20
μ Cassiop.		2	+54	.022	.27	174	π Ceti		40	−14	.025	.25
η Ceti	1	4	−11	.025	.22	175	μ Ceti	2	40	+10	.020	.21
β Androm.		5	+35	.013	.17	177	η Persei		44	+56	.010	.25
τ Piscium		7	+30	.019	.33	178	41 Arietis		45	+27	.020	.22
ζ Piscium		9	+ 7	.019	.24	179	β Fornacis		45	−33	.050	.47
κ Tucanæ		13	−69	....	...	180	σ Arietis		47	+15	.018	.24
f Piscium	1	13	+ 3	.022	.29	181	τ² Eridani	2	47	−21	.022	.32
υ Piscium		15	+27	.022	.25	182	τ Persei		48	+52	.020	.19
θ Ceti		20	− 9	.013	.19	183	η Eridani		52	− 9	.016	.21
δ Cassiop.		20	+60	.018	.19	185	ε Arietis		54	+21	.016	.23
γ Phœnicis		25	−44	.044	.35	184	47 H. Cephei		54	+79	.035	.32
38 Cassiop.	1	25	+70	.026	.28	187	θ Eridani	2	55	−41	.056	.42
η Piscium		27	+15	.020	.19	189	α Ceti		58	+ 4	.010	.13
α Urs. Min.		28	+89	....	...	190	γ Persei		58	+53	.029	.20
40 Cassiop.		31	+73	.028	.25	191	τ³ Eridani	2	59	−24	.029	.32
υ Androm.		32	+41	.024	.26	192	ρ Persei	3	0	+38	.019	.24
π Piscium	1	32	+12	.022	.25	194	μ Horologii	3	2	−60	.060	.49
υ Persei		33	+48	.018	.19	197	θ Hydri		2	−72	.046	.47
α Eridani		34	−58	....	...	195	β Persei		2	+41	.016	.20
ω Cassiop.		36	+68	.025	.25	199	δ Arietis		7	+19	.014	.17
ν Piscium		37	+ 5	.014	.20	202	12 Eridani		8	−29	.022	.30
φ Persei	1	38	+50	.022	.20	200	48 H. Cephei	3	9	+77	.032	.32
τ Ceti		40	−16	.020	.25	203	ζ Arietis		10	+21	.018	.29
ο Piscium		41	+ 9	.013	.19	204	38 Horologii		10	−58	....	...
ε Sculpt.	1	42	−26	.037	.46	206	ζ Eridani	3	12	− 9	.022	.3

MEAN ERRORS OF NEWCOMB'S PLACES FOR 1920 OF STARS OF THE AMERICAN EPHEMERIS AND NAUTICAL ALMANAC.

Cat. No.	Name.	R. A. 1912.		Decl. 1912.	Mean Error 1920.		Cat. No.	Name.	R. A. 1912.		Decl. 1912.	Mean Error 1920.	
					α	δ						α	δ
		h	m	°	s	″			h	m	°	s	″
209	τ Arietis	3	16	+21	.027	.32	319	η Aurigæ	5	0	+41	.021	.21
210	*e* Eridani		16	−43	.056	.49	320	ε Leporis		2	−22	.021	.25
211	α Persei		18	+50	.013	.14	322	β Eridani		4	− 5	.016	.21
212	ι Hydri		18	−78	....	...	327	μ Aurigæ		7	+38	.028	.29
213	ο Tauri		20	+ 9	.014	.21	326	19 H. Camel.		8	+79	.025	.33
214	2 H. Camel.	3	22	+60	.028	.37	328	μ Leporis	5	9	−16	.032	.31
215	ξ Tauri		22	+ 9	.023	.22	329	α Aurigæ		10	+46	.012	.14
219	*f* Tauri		26	+13	.016	.22	330	β Orionis		10	− 8	.009	.15
221	ε Eridani		29	−10	.014	.17	332	λ Aurigæ		13	+40	.027	.27
222	τ^5 Eridani		30	−22	.031	.40	333	τ Orionis		13	− 7	.014	.24
230	δ Persei	3	37	+48	.016	.16	335	ο Columbæ	5	14	−35	.068	.60
235	δ Eridani		39	−10	.020	.24	342	γ Orionis		20	+ 6	.017	.21
234	ν Persei		39	+42	.024	.25	343	β Tauri		21	+29	.010	.14
237	5 H. Camel.		41	+71	.025	.29	344	17 Camelop.		22	+63	.029	.22
238	η Tauri		42	+24	.014	.17	347	β Leporis		24	−21	.025	.33
239	τ^6 Eridani	3	43	−24	.023	.30	348	χ Aurigæ	5	27	+32	.022	.30
243	*g* Eridani		46	−36	.073	.63	350	δ Orionis		28	0	.012	.16
246	γ Hydri		49	−75	.031	.29	349	Gr. 966		28	+75	.022	.22
244	ζ Persei		49	+32	.019	.22	354	α Leporis		29	−18	.018	.22
245	9 H. Camel.		50	+61	.031	.33	355	ϕ^1 Orionis		30	+ 9	.021	.31
248	ε Persei	3	52	+40	.019	.22	359	ι Orionis	5	31	− 6	.022	.25
250	ξ Persei		53	+36	.019	.22	361	ε Orionis		32	− 1	.013	.17
251	γ Eridani		54	−14	.017	.19	362	ζ Tauri		32	+21	.019	.23
252	λ Tauri		56	+12	.018	.22	356	Gr. 944		34	+85	.030	.35
254	δ Reticuli		57	−62	.044	.36	366	ζ Orionis		36	− 2	.016	.22
255	ν Tauri	3	58	+ 6	.018	.22	368	α Columbæ	5	36	−34	.024	.28
256	A Tauri	3	59	+22	.020	.23	369	ο Aurigæ		39	+50	.028	.39
260	*c* Persei	4	2	+47	.020	.22	372	ζ Leporis		43	−15	.023	.30
263	*p* Tauri		5	+26	.030	.37	373	κ Orionis		44	−10	.013	.19
265	o^1 Eridani		8	− 7	.016	.23	375	δ Doradus		45	−66	....	...
264	Gr. 750	4	9	+85	.017	.24	374	ν Aurigæ	5	45	+39	.021	.26
268	μ Tauri		11	+ 9	.027	.47	381	31 Mensæ		47	−85	.042	.56
270	α Horologii		11	−43	.073	.69	378	δ Leporis		48	−21	.036	.37
271	α Reticuli		13	−63	.061	.54	382	α Orionis		50	+ 7	.008	.14
274	γ Tauri		15	+15	.013	.21	383	δ Aurigæ		52	+54	.026	.25
277	δ Tauri	4	18	+17	.017	.23	385	η Leporis	5	52	−14	.022	.22
279	υ^5 Eridani		21	−34	.046	.42	387	β Aurigæ		53	+45	.016	.16
281	ε Tauri		23	+19	.013	.20	388	θ Aurigæ		54	+37	.020	.20
284	δ Mensæ		24	−80	.058	.52	393	1 Gemin.	5	59	+23	.021	.30
285	*m* Persei		27	+43	.031	.34	395	1 Puppis	6	2	−45	.057	.55
288	α Tauri	4	31	+16	.009	.13	396	ν Orionis	6	3	+15	.016	.19
289	ν Eridani		32	− 4	.018	.24	402	22 H. Camel.		9	+69	.022	.26
291	α Doradus		32	−55	.054	.40	405	η Gemin.		10	+23	.014	.20
292	53 Eridani		34	−14	.023	.28	406	2 Lyncis		12	+59	.023	.22
296	τ Tauri		37	+23	.014	.23	411	ζ Can. Maj.		17	−30	.055	.44
294	Gr. 848	4	37	+76	.024	.30	412	μ Gemin.	6	18	+23	.013	.17
297	α Cœli		38	−42	.050	.46	413	ψ^1 Aurigæ		18	+49	.025	.23
298	4 Camelop.		41	+57	.027	.25	414	β Can. Maj.		19	−18	.019	.22
299	μ Eridani		41	− 3	.016	.21	415	8 Monoc.		19	+ 5	.022	.24
303	π^3 Orionis		45	+ 7	.021	.22	416	α Argûs		22	−53	....	...
302	9 Camelop.	4	45	+66	.021	.19	418	10 Monoc.	6	24	− 5	.017	.37
304	*i* Tauri		46	+19	.023	.31	419	ν Gemin.		24	+20	.027	.21
307	π^6 Orionis		50	+ 2	.016	.22	423	8 Lyncis		30	+62	[illegible]	.23
309	ι Aurigæ		51	+33	.014	.17	424	23 H. Camel.		31	+80	.024	.29
312	β Camelop.		56	+60	.023	.19	425	ξ^2 Can. Maj.		31	−22	.034	.35
313	ε Aurigæ	4	56	+44	.021	.19	426	51 Aurigæ	6	33	+39	.025	.31
314	ζ Aurigæ		56	+41	.017	.22	427	γ Gemin.		33	+16	.013	.17
316	ι Tauri	4	58	+21	.019	.26	429	ν Argûs		35	−43	.058	.48
	11 Orionis	5	0	+15	.020	.35	430	S Monoc.	6	36	[illegible]	.016	[illegible]

MEAN ERRORS OF NEWCOMB'S PLACES FOR 1920 OF STARS OF THE AMERICAN EPHEMERIS AND NAUTICAL ALMANAC.

Cat. No.	Name.	R. A. 1912.		Decl. 1912.	Mean Error 1920.	
					α	δ
		h	m	°	s	″
431	ε Gemin.	6	39	+25	.014	.19
433	ξ Gemin.		40	+13	.013	.21
432	ψ^5 Aurigæ		40	+44	.029	.24
434	α Can. Maj.		41	−17	....	.16
435	18 Monoc.		43	+ 3	.020	.25
436	43 Camelop.	6	44	+69	.027	.24
440	θ Gemin.		47	+34	.020	.22
441	α Pictoris		47	−62	.061	.63
443	ζ Mensæ		47	−81	.048	.47
442	τ Argûs		48	−51	.069	.64
444	15 Lyncis	6	50	+59	.023	.21
446	θ Can. Maj.		50	−12	.021	.31
451	ε Can. Maj.		55	−29	.017	.23
454	ζ Gemin.		59	+21	.016	.19
455	o^2 Can. Maj.	6	59	−24	.025	.29
449	51 H. Cephei	7	0	+87	....	...
456	γ Can. Maj.		0	−16	.021	.28
460	δ Can. Maj.		5	−26	.020	.24
461	63 Aurigæ		6	+39	.021	.26
464	51 Gemin.		8	+16	.023	.37
465	γ^2 Volantis	7	9	−70	.071	.64
467	25 H. Camel.		13	+83	.025	.24
469	λ Gemin.		13	+17	.013	.22
470	π Argûs		14	−37	.046	.34
471	δ Gemin.		15	+22	.014	.17
474	δ Volantis	7	17	−68	.061	.64
480	7 Octantis		18	−87	.053	.46
476	ι Gemin.		20	+28	.014	.22
477	η Can. Maj.		21	−29	.021	.25
478	Gr. 1308		22	+69	.028	.26
479	β Can. Min.	7	22	+ 8	.014	.19
481	ρ Gemin.		23	+32	.021	.27
483	σ Argûs		26	−43	.060	.46
484	α^2 Gemin.		29	+32	.019	.14
488	25 Monoc.		33	− 4	.040	.42
492	α Can. Min.	7	35	+ 5	....	.15
493	24 Lyncis		36	+59	.033	.29
495	κ Gemin.		39	+25	.018	.22
496	β Gemin.		40	+28	.010	.12
499	4 Puppis		42	−14	.028	.36
502	ξ Argûs	7	46	−25	.021	.27
505	φ Gemin.		48	+27	.018	.28
506	26 Lyncis		48	+48	.022	.30
507	Gr. 1374		50	+74	.029	.32
514	χ Argûs		55	−53	.052	.40
515	ω Cancri	7	56	+26	.022	.30
517	χ Gemin.	7	58	+28	.018	.24
520	27 Lyncis	8	2	+52	.022	.23
523	ρ Argûs		4	−24	.018	.24
522	3 H. Ur. Maj.		4	+69	.025	.29
525	γ Argûs	8	7	−47	.051	.44
526	ζ Cancri		7	+18	.022	.25
527	Br. 1147		9	+76	.026	.31
528	20 Puppis		9	−16	.023	.32
518	Gr. 1119		11	+89	.025	...
529	β Cancri	8	12	+ 9	.013	.24
533	31 Lyncis		17	+43	.027	.22
534	d^1 Cancri		18	+19	.022	.29
535	ε Argûs	8	21	−59	.038	.33
536	30 Monoc.	8	21	− 4	.017	.23
537	ο Urs. Maj.		23	+61	.014	.15
539	θ Chamæl.		23	−77	.050	.40
543	Gr. 1450		27	+38	.047	.43
544	η Cancri		28	+21	.019	.20
545	Gr. 1446	8	30	+74	.032	.38
547	δ Hydræ		33	+ 6	.019	.26
548	σ Hydræ		34	+ 4	.023	.27
554	γ Cancri		38	+22	.016	.21
556	δ Cancri		40	+18	.017	.21
557	α Pyxidis	8	40	−33	.053	.42
558	ι Cancri		41	+29	.025	.26
559	ε Hydræ		42	+ 7	.014	.19
560	δ Argûs		42	−54	.053	.41
566	σ^2 Cancri		49	+31	.022	.31
567	ζ Hydræ	8	51	+ 6	.018	.24
569	ι Urs. Maj.		53	+48	.016	.17
571	α Cancri		54	+12	.015	.20
574	b^1 Carinæ		55	−59	.044	.43
576	κ Urs. Maj.	8	58	+48	.018	.19
582	σ^2 Urs. Maj.	9	2	+67	.020	.28
583	κ Cancri		3	+11	.016	.22
585	λ Argûs		5	−43	.039	.32
590	ζ Octantis		10	−85	.041	.38
589	θ Hydræ		10	+ 3	.014	.19
591	β Argûs	9	12	−69	.035	.28
593	83 Cancri		14	+18	.018	.24
594	ι Argûs		15	−59	....	...
595	40 Lyncis		16	+35	.018	.21
596	θ Pyxidis		18	−26	.046	.61
599	α Hydræ	9	23	− 8	.010	.15
601	h Urs. Maj.		25	+63	.019	.19
600	1 H. Draco.		25	+82	.016	.20
603	d Urs. Maj.		27	+70	.025	.24
604	θ Urs. Maj.		27	+52	.017	.17
605	ξ Leonis	9	27	+12	.024	.30
606	ψ Argûs		27	−40	.056	.51
607	10 Leo. Min.		29	+37	.020	.27
619	ο Leonis		36	+10	.014	.16
620	ζ Chamæl.		37	−81	.047	.48
622	θ Antliæ	9	40	−27	.057	.49
623	ε Leonis		41	+24	.014	.17
626	υ Urs. Maj.		45	+59	.013	.17
627	υ Argûs		45	−65	.049	.38
629	6 Sextantis		47	− 4	.030	.35
630	μ Leonis	9	48	+26	.014	.19
632	Gr. 1586		51	+73	.026	.32
634	19 Leo. Min.		52	+41	.022	.24
636	φ Argûs		54	−54	.045	.37
638	π Leonis	9	56	+ 8	.012	.20
641	η Leonis	10	3	+17	.022	.22
642	α Leonis		4	+12	.015	.13
644	λ Hydræ		6	−12	.019	.24
645	q Velorum		11	−42	.088	.76
646	32 Urs. Maj.		12	+66	.024	.25
647	λ Urs. Maj.	10	12	+43	.017	.16
648	ζ Leonis		12	+24	.018	.22
653	γ Leonis *pr.*		15	+20	.019	.15
657	μ Urs. Maj.	10	17	+42	.016	[illegible]

MEAN ERRORS OF NEWCOMB'S PLACES FOR 1920 OF STARS OF THE AMERICAN EPHEMERIS AND NAUTICAL ALMANAC.

Cat. No.	Name.	R. A. 1912.	Decl. 1912.	Mean Error 1920.		Cat. No.	Name.	R. A. 1912.	Decl. 1912.	Mean Error 1920.	
				α	δ					α	δ
		h m	°	s	″			h m	°	s	″
658	30 H.Ur.Maj.	10 18	+66	.031	.27	770	β Chamæl.	12 13	−79	.037	.32
659	30 H. Camel.	20	+83	.026	.30	772	Br. 1672	14	+88	.016	.22
661	μ Hydræ	22	−16	.018	.22	773	η Virginis	15	0	.013	.17
662	31 Leo. Min.	23	+37	.019	.24	780	α¹ Crucis	22	−63	....	...
664	α Antliæ	23	−31	.044	.35	787	20 Comæ	25	+21	.034	.38
666	36 Urs. Maj.	10 25	+56	.022	.25	786	δ Corvi	12 25	−16	.018	.22
668	9 H. Draco.	28	+76	.019	.21	789	γ Crucis	26	−57	.084	.37
669	ρ Leonis	28	+10	.016	.21	791	8 Can. Ven.	30	+42	.022	.23
679	33 Sextantis	37	− 1	.024	.31	793	κ Draconis	30	+70	.018	.14
683	41 Leo. Min.	39	+24	.022	.26	792	β Corvi	30	−23	.019	.21
684	θ Argûs	10 40	−64	.052	.41	795	24 Comæ *seq.*	12 31	+19	.025	.30
685	42 Leo. Min.	41	+31	.019	.28	796	α Muscæ	32	−69	.063	.51
687	η Argûs	42	−59	....	...	799	χ Virginis	35	− 8	.024	.31
688	μ Argûs	43	−49	.049	.37	800	γ Centauri	37	−48	.041	.33
689	l Leonis	45	+11	.015	.20	801	γ Virginis	37	− 1	.018	.24
691	δ² Chamæl.	10 45	−80	.047	.39	802	ρ Virginis	12 37	+11	.023	.29
690	ν Hydræ	45	−16	.022	.24	803	76 Urs. Maj.	38	+63	.034	.26
692	46 Leo. Min.	48	+35	.019	.21	808	β Crucis	43	−59	.034	.29
694	54 Leonis	51	+25	.027	.35	810	ι Octantis	46	−85	.046	.37
696	ι Antliæ	53	−37	.072	.95	812	31 Comæ	47	+28	.024	.27
695	Gr. 1706	10 53	+78	.034	.40	814	32 H. Camel.	48	+84	.021	.23
698	α Crateris	55	−18	.020	.25	813	n Centauri	12 49	−40	.068	.62
699	d Leonis	56	+ 4	.018	.24	816	ε Urs. Maj.	50	+56	.017	.19
701	β Urs. Maj.	57	+57	.017	.16	817	δ Virginis	51	+ 4	.013	.17
702	α Urs. Maj.	10 58	+62	.016	.15	818	α Can. Ven.	52	+39	.014	.17
704	η Octantis	11 0	−84	.044	.42	820	δ Muscæ	56	−71	.017	.33
703	χ Leonis	0	+ 8	.013	.19	821	ε Virginis	12 58	+11	.013	.17
706	p⁴ Leonis	2	+ 2	.022	.25	827	θ Virginis	13 5	− 5	.014	.17
708	ψ Urs. Maj.	5	+45	.016	.17	830	43 Comæ	8	+28	.019	.25
710	β Crateris	7	−22	.021	.33	836	20 Can. Ven.	14	+41	.024	.24
712	δ Leonis	11 9	+21	.014	.16	838	γ Hydræ	13 14	−23	.022	.35
713	θ Leonis	10	+16	.019	.21	839	ι Centauri	16	−36	.056	.43
718	ν Urs. Maj.	14	+34	.021	.21	842	ζ¹ Urs. Maj.	20	+55	.020	.19
719	δ Crateris	15	−14	.017	.19	843	α Virginis	21	−11	.008	.14
720	σ Leonis	17	+ 7	.014	.19	846	Gr. 2001	24	+73	.026	.31
721	π Centauri	11 17	−54	....	...	845	70 Virginis	13 24	+14	.025	.31
723	ι Leonis	19	+11	.018	.21	847	κ Octantis	26	−85	.039	.35
727	τ Leonis	23	+ 3	.016	.21	852	ζ Virginis	30	0	.010	.17
730	λ Draconis	26	+70	.016	.16	854	17 H. Can. V.	31	+38	.041	.42
731	ξ Hydræ	29	−31	.050	.39	857	ε Centauri	34	−53	.039	.34
733	λ Centauri	11 32	−63	.053	.48	859	m Virginis	13 37	− 8	.015	.22
734	υ Leonis	32	0	.016	.18	863	τ Boötis	43	+18	.018	.19
735	π Chamæl.	34	−75	.079	.80	866	η Urs. Maj.	44	+50	.012	.14
737	3 Draconis	38	+67	.025	.25	867	89 Virginis	45	−18	.027	.35
738	ζ Crateris	40	−18	.019	.29	871	ζ Centauri	50	−47	.042	.33
740	χ Urs. Maj.	11 41	+48	.016	.17	872	η Boötis	13 50	+19	.012	.17
744	β Leonis	45	+15	.010	.14	878	θ Apodis	57	−76	....	...
745	β Virginis	46	+ 2	.012	.14	879	τ Virginis	57	+ 2	.013	.18
747	Gr. 1830	48	+38	.037	.32	880	11 Boötis	57	+28	.023	.26
748	γ Urs. Maj.	49	+54	.012	.14	881	β Centauri	13 58	−60	....	...
753	π Virginis	11 56	+ 7	.016	.21	882	π Hydræ	14 1	−26	.021	.26
758	ο Virginis	12 1	+ 9	.016	.15	883	θ Centauri	1	−36	.044	.33
760	δ Centauri	4	−50	.067	.46	885	α Draconis	2	+65	.016	.17
762	ε Corvi	6	−22	.020	.23	888	d Boötis	6	+26	.023	.38
763	4 H. Draco.	8	+78	.017	.19	889	κ Virginis	8	−10	.013	.21
765	δ Crucis	12 10	−58	.058	.45	890	4 Urs. Min.	14 9	+78	.018	.24
766	δ Urs. Maj.	11	+58	.020	.17	891	ι Virginis	11	− 6	.017	.21
767	γ Corvi	11	−17	.019	.20	893	α Boötis	12	+20	.008	.13
8	2 Can. Ven.	12 12	+41	.032	.32	892	δ Octantis	14 13	−83	.035	.30

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Name.	R. A. 1912.	Decl. 1912.	Mean Error 1920.		Cat. No.	Name.	R. A. 1912.	Decl. 1912.	Mean Error 1920.	
			α	δ					α	δ
	h m	°	s	″			h m	°	s	″
λ Boötis	14 13	+46	.019	.21	1011	ε Cor. Bor.	15 54	+27	.023	.24
λ Virginis	14	−13	.017	.24	1012	δ Scorpii	15 55	−22	.020	.26
2 Libræ	19	−11	.025	.33	1019	θ Draconis	16 0	+59	.018	.17
θ Boötis	22	+52	.018	.17	1017	β Scorpii	0	−20	.014	.17
f Boötis	22	+20	.021	.26	1021	κ Herculis	4	+17	.028	.33
φ Virginis	14 24	− 2	.018	.25	1026	φ Herculis	16 6	+45	.025	.22
5 Urs. Min.	28	+76	.019	.21	1027	Gr. 2320	6	+68	.032	.35
ρ Boötis	28	+31	.016	.19	1023	δ¹ Apodis	7	−78	.053	.49
γ Boötis	29	+39	.017	.21	1030	δ Ophiuchi	10	− 3	.012	.17
η Centauri	30	−42	.045	.37	1031	σ Cor. Bor. *seq.*	11	+34	.037	.42
σ Boötis	14 31	+30	.025	.32	1032	γ² Normæ	16 13	−50	.049	.38
α² Centauri	34	−60	....	...	1034	19 Urs. Min.	13	+76	.029	.23
33 Boötis	36	+45	.034	.33	1033	ε Ophiuchi	14	− 4	.014	.22
α Apodis	37	−79	.044	.47	1035	σ Scorpii	16	−25	.019	.28
μ Virginis	38	− 5	.014	.21	1036	τ Herculis	17	+47	.022	.20
ε Boötis	14 41	+27	.016	.16	1039	γ Herculis	16 18	+19	.016	.21
109 Virginis	42	+ 2	.018	.22	1041	γ Apodis	20	−79	.033	.38
8 Libræ	46	−16	.018	.20	1045	η Urs. Min.	20	+76	.022	.22
α Libræ	46	−16	.010	.14	1046	ω Herculis	21	+14	.030	.37
Gr. 2164	49	+60	.033	.35	1050	η Draconis	23	+62	.018	.17
β Urs. Min.	14 51	+75	.016	.16	1051	α Scorpii	16 24	−26	.013	.21
ξ² Libræ	52	−11	.018	.23	1056	β Herculis	26	+22	.018	.21
Piazzi 221	52	+15	.025	.29	1055	λ Ophiuchi	26	+ 2	.017	.22
β Lupi	53	−43	.054	.45	1059	A Draconis	28	+69	.022	.19
δ Libræ	56	− 8	.026	.25	1061	τ Scorpii	30	−28	.021	.25
β Boötis	14 59	+41	.020	.22	1062	σ Herculis	16 31	+43	.017	.18
γ Scorpii	14 59	−25	.024	.29	1063	ζ Ophiuchi	32	−10	.014	.20
ψ Boötis	15 1	+27	.018	.22	1065	24 Scorpii	36	−18	.022	.30
c Boötis	3	+25	.030	.33	1067	ζ Herculis	38	+32	.016	.17
Gr. 2283	5	+88	.023	.29	1068	α Tri. Aust.	39	−69	.036	.29
ζ Lupi	15 6	−52	.059	.51	1069	η Herculis	16 40	+39	.015	.17
ι Libræ	7	−19	.021	.24	1071	Gr. 2377	44	+57	.038	.45
γ Tri. Aust.	11	−68	.044	.36	1073	ε Scorpii	44	−34	.040	.33
3 Serpentis	11	+ 5	.029	.31	1078	49 Herculis	48	+15	.024	.29
δ Boötis	12	+34	.018	.23	1083	ε¹ Aræ	53	−53	.056	.50
β Libræ	15 12	− 9	.013	.17	1084	κ Ophiuchi	16 54	+10	.014	.17
γ Urs. Min.	21	+72	.018	.16	1087	ε Urs. Min.	55	+82	.018	.16
μ Boötis *pr.*	21	+38	.019	.22	1086	30 Ophiuchi	56	− 4	.035	.39
τ¹ Serpentis	22	+16	.026	.36	1088	ε Herculis	57	+31	.016	.21
ρ Octantis	23	−84	.037	.38	1089	*d* Herculis	16 58	+34	.026	.30
ι Draconis	15 23	+59	.025	.21	1092	η Ophiuchi	17 5	−16	.016	.17
ζ Libræ	23	−16	.018	.28	1093	η Scorpii	6	−43	.044	.34
β Cor. Bor.	24	+29	.025	.22	1094	ζ Draconis	9	+66	.020	.19
ν¹ Boötis	28	+41	.023	.31	1096	α Herculis	11	+14	.010	.14
γ Lupi (*mean*)	29	−41	.043	.35	1098	δ Herculis	11	+25	.020	.24
γ Libræ	15 31	−14	.021	.24	1100	π Herculis	17 12	+37	.018	.22
α Cor. Bor.	31	+27	.010	.13	1101	59 Apodis	15	−81	.073	.74
ζ Cor. Bor. *seq.*	36	+37	.027	.36	1105	θ Ophiuchi	17	−25	.019	.21
α Serpentis	40	+ 7	.010	.13	1106	*w* Herculis	17	+33	.027	.30
β Serpentis	42	+16	.018	.21	1107	β Aræ	18	−55	.069	.49
κ Serpentis	15 45	+18	.024	.25	1109	*b* Ophiuchi	17 21	−24	.018	.29
μ Serpentis	45	− 3	.019	.35	1111	σ Ophiuchi	22	+ 4	.017	.22
12 H. Draco.	45	+63	.028	.32	1112	δ Aræ	23	−61	....	...
ε Serpentis	46	+ 5	.014	.19	1115	α Aræ	25	−50	.056	.46
ζ Urs. Min.	47	+78	.016	.15	1117	λ Herculis	27	+26	.031	.37
β Tri. Aust.	15 47	−63	.059	.45	1118	λ Scorpii	17 28	−37	.058	.47
λ Libræ	48	−20	.026	.36	1119	β Draconis	28	+52	.014	.15
γ Serpentis	52	+16	.016	.23	1123	α Ophiuchi	31	+13	.010	.14
π *Scorpii*	15 54	−26	.023	.29	1125	ξ Serpentis	17 33	−15	.024	.24

MEAN ERRORS OF NEWCOMB'S PLACES FOR 1920 OF STARS OF THE AMERICAN EPHEMERIS AND NAUTICAL ALMANAC.

Cat. No.	Name.	R. A. 1912.	Decl. 1912.	Mean Error 1920.		Cat. No.	Name.	R. A. 1912.	Decl. 1912.	Mean Error 1920.	
				α	δ					α	δ
		h m	°	s	″			h m	°	s	″
1131	ι Herculis	17 37	+46	.018	.17	1239	*d* Sagittarii	19 12	−19	.014	.29
1129	η Pavonis	37	−65	.067	.58	1240	δ Draconis	13	+68	.016	.16
1132	ω Draconis	37	+69	.021	.21	1241	θ Lyræ	13	+38	.025	.34
1134	β Ophiuchi	39	+ 5	.013	.17	1242	ω Aquilæ	14	+11	.019	.21
1135	ι^1 Scorpii	41	−40	.066	.54	1243	κ Cygni	15	+53	.019	.19
1137	μ Herculis	17 43	+28	.014	.19	1248	τ Draconis	19 17	+73	.019	.20
1138	γ Ophiuchi	43	+ 3	.017	.21	1224	σ Octantis	20	−89	.025	.22
1140	ψ Draconis	44	+72	.021	.20	1251	δ Aquilæ	21	+ 3	.012	.17
1145	89 Herculis	52	+26	.025	.33	1259	β Cygni	27	+28	.014	.22
1146	ξ Draconis	52	+57	.021	.21	1260	ι Cygni	27	+52	.020	.19
1147	θ Herculis	17 53	+37	.017	.21	1264	μ Aquilæ	19 30	+ 7	.024	.28
1150	35 Draconis	53	+77	.022	.23	1265	*h* Sagittarii	31	−25	.019	.26
1148	ν Ophiuchi	54	−10	.016	.22	1266	κ Aquilæ	32	− 7	.018	.28
1149	ξ Herculis	54	+29	.034	.30	1269	θ Cygni	34	+50	.019	.21
1151	γ Draconis	55	+51	.013	.16	1271	54 Sagittarii	36	−16	.022	.30
1152	67 Ophiuchi	17 56	+ 3	.031	.26	1273	β Sagittæ	19 37	+17	.016	.26
1156	θ Aræ	18 0	−50	.056	.50	1281	15 Cygni	41	+37	.029	.29
1158	γ Sagittarii	0	−30	.021	.39	1280	*f* Sagittarii	41	−20	.020	.30
1164	δ Urs. Min.	1	+87	....	...	1282	γ Aquilæ	42	+10	.009	.15
1159	70 Ophiuchi	1	+ 3	.022	.26	1283	δ Cygni	42	+45	.021	.18
1160	72 Ophiuchi	18 3	+10	.016	.19	1284	δ Sagittæ	19 43	+18	.017	.23
1153	χ Octantis	3	−88	.034	.30	1286	α Aquilæ	46	+ 9	.010	.14
1161	ο Herculis	4	+29	.019	.22	1288	η Aquilæ	48	+ 1	.022	.26
1166	μ Sagittarii	9	−21	.016	.19	1290	ε Draconis	48	+70	.024	.19
1169	η Sagittarii	12	−37	.057	.50	1289	ι Sagittarii	49	−42	.073	.62
1170	Gr. 2533	18 13	+42	.035	.40	1291	ε Pavonis	19 50	−73	....	...
1171	36 Draconis	13	+64	.020	.21	1292	β Aquilæ	51	+ 6	.008	.14
1173	δ Sagittarii	15	−30	.020	.25	1297	γ Sagittæ	55	+19	.017	.22
1174	η Serpentis	17	− 3	.016	.17	1299	*c* Sagittarii	19 57	−28	.017	.24
1175	ε Sagittarii	18	−34	.055	.46	1304	τ Aquilæ	20 0	+ 7	.022	.33
1178	109 Herculis	18 20	+22	.018	.21	1308	θ Aquilæ	20 7	− 1	.013	.18
1179	α Telescopii	20	−46	.049	.41	1314	*o* Cyg. *seq.*	11	+46	.019	.21
1182	λ Sagittarii	23	−25	.017	.22	1318	κ Cephei	12	+77	.018	.19
1185	χ Draconis	23	+73	.020	.20	1319	24 Vulpeculæ	13	+24	.025	.30
1187	*c* Serpentis	25	− 2	.027	.38	1320	α^2 Capricorni	13	−13	.012	.17
1189	1 Aquilæ	18 30	− 8	.013	.25	1321	β Capricorni	20 16	−15	.022	.21
1190	ζ Pavonis	33	−72	.016	.40	1324	α Pavonis	19	−57	....	...
1193	α Lyræ	34	+39	.009	.15	1325	γ Cygni	19	+40	.013	.17
1196	2 Aquilæ	37	− 9	.029	.30	1328	π Capricorni	22	−19	.019	.27
1199	φ Sagittarii	40	−27	.022	.26	1329	ρ Capricorni	24	−18	.018	.21
1202	110 Herculis	18 42	+20	.020	.22	1332	41 Cygni	20 26	+30	.029	.35
1204	6 Aquilæ	43	− 5	.020	.32	1336	θ Cephei	28	+63	.018	.17
1206	λ Pavonis	44	−62	.059	.52	1337	ε Delphini	29	+11	.013	.19
1209	β Lyræ	47	+33	.013	.16	1340	Gr. 3241	30	+72	.034	.40
1212	50 Draconis	49	+75	.031	.25	1341	α Indi	31	−48	.046	.37
1211	σ Sagittarii	18 50	−26	.018	.27	1344	β Delphini	20 33	+14	.016	.22
1213	ο Draconis	50	+59	.028	.21	1348	υ Capricorni	35	−18	.023	.33
1215	θ Serp. *pr.*	52	+ 4	.017	.25	1349	α Delphini	36	+16	.014	.22
1218	R Lyræ	53	+44	.025	.31	1350	β Pavonis	37	−67	....	...
1219	ε Aquilæ	56	+15	.017	.19	1352	α Cygni	38	+45	.010	.12
1220	γ Lyræ	18 56	+33	.018	.22	1353	δ Delphini	20 39	+15	.019	.24
1222	ζ Sagittarii	18 57	−30	.042	.37	1354	ψ Capricorni	41	−26	.028	.32
1226	ζ Aquilæ	19 1	+14	.014	.15	1356	γ Delph. *seq.*	43	+16	.024	.30
1227	λ Aquilæ	2	− 5	.014	.23	1357	ε Cygni	43	+34	.014	.21
1228	α Cor. Aust.	3	−38	.050	.42	1358	ε Aquarii	43	−10	014	.19
1230	ι Lyræ	19 4	+36	.025	.29	1361	η Cephei	20 44	+61	.018	.16
1231	π Sagittarii	5	−21	.019	.23	1366	μ Aquarii	48	− 9	.016	.22
1255	*λ Urs. Min.*	9	+89	....	...	1364	β Indi	48	−59	.067	.58
	ψ Sagittarii	19 10	−25	.021	.31	1368	76 Draconis	20 49	+82	.022	.21

ERRORS OF NEWCOMB'S PLACES FOR 1920 OF STARS OF THE AMERICAN EPHEMERIS AND NAUTICAL ALMANAC.

Name.	R. A. 1912.	Decl. 1912.	Mean Error 1920. α	Mean Error 1920. δ
	h m	°	s	″
2 Vulpeculæ	20 51	+28	.018	.22
Draco.	52	+80	.021	.25
Cygni	54	+41	.022	.22
Octantis	54	−77	.055	.46
Microscop.	20 56	−33	.037	.49
Capricorni	21 1	−18	.017	.22
ξ Cygni	2	+44	.018	.20
1 Cygni *pr.*	3	+38	.020	.19
Aquarii	5	−12	.019	.28
Br. 2777	7	+78	.023	.21
3 Pisc. Aust.	21 8	−28	.032	.46
ζ Cygni	9	+30	.015	.18
Cygni	11	+38	.022	.22
Equulei	11	+ 5	.015	.20
Cygni	14	+39	.021	.28
Microscop.	21 15	−41	.074	.80
Cephei	16	+62	.016	.14
ι Capricorni	17	−17	.021	.25
1 Pegasi	18	+19	.020	.27
Pavonis	19	−66	.061	.43
ζ Capricorni	21 22	−23	.024	.31
Cygni	26	+46	.028	.29
Aquarii	27	− 6	.018	.18
Cephei	28	+70	.014	.14
ξ Aquarii	33	− 8	.016	.22
4 Cygni	21 33	+40	.029	.31
Capricorni	35	−17	.018	.26
Octantis	38	−83	.065	.51
ε Pegasi	40	+ 9	.012	.18
1 Cephei	41	+71	.028	.26
Capricorni	21 42	−17	.017	.21
^{2}Cygni	44	+49	.022	.24
ι Capricorni	48	−14	.016	.23
Gruis	49	−38	.064	.52
6 Pegasi	49	+26	.018	.22
9 Draconis	21 52	+73	.023	.25
ε Indi	57	−57	.058	.80
Pegasi	21 57	+13	.022	.25
Aquarii	22 1	− 1	.010	.13
ι Aquarii	2	−14	.020	.22
Cephei	22 2	+62	.029	.29
Gruis	3	−47	....	...
ι Pegasi	3	+25	.019	.21
θ Pegasi	6	+ 6	.017	.22
Pegasi	6	+33	.022	.25
ζ Cephei	22 8	+58	.018	.18
4 Cephei	8	+72	.021	.22
θ Aquarii	12	− 8	.013	.21
Tucanæ	12	−61	.041	.32
υ Octantis	15	−86	.026	.22
Aquarii	22 17	− 2	.013	.18
1 Pegasi	17	+12	.024	.28
3 Lacertæ	20	+52	.018	.20
Aquarii	21	+ 1	.018	.30
σ Aquarii	26	−11	.016	.21
Lacertæ	22 28	+50	.020	.19
υ Aquarii	30	−21	.026	.33
6 B. Cephei	31	+76	.026	.25
η Aquarii	*22 31*	*− 1*	*.013*	*.19*

Cat. No.	Name.	R. A. 1912.	Decl. 1912.	Mean Error 1920. α	Mean Error 1920. δ
		h m	°	s	″
1495	10 Lacertæ	22 35	+39	.027	.30
1497	ε Pisc. Aust.	36	−28	.028	.38
1499	ζ Pegasi	37	+10	.013	.17
1498	β Octantis	37	−82	.036	.30
1500	β Gruis	37	−47	.060	.46
1501	η Pegasi	22 39	+30	.017	.21
1504	λ Pegasi	42	+23	.016	.21
1505	ε Gruis	43	−52	.052	.48
1506	τ Aquarii	45	−14	.018	.24
1507	μ Pegasi	46	+24	.016	.19
1510	ι Cephei	22 47	+66	.014	.17
1512	λ Aquarii	48	− 8	.013	.19
1513	ρ Indi	49	−71	.051	.62
1514	δ Aquarii	50	−16	.019	.25
1516	α Pisc. Aust.	53	−30	.032	.28
1520	ο Androm.	22 58	+42	.017	.22
1523	β Pegasi	23 0	+28	.020	.21
1525	α Pegasi	0	+15	.010	.14
1528	55 Pegasi	3	+ 9	.029	.40
1531	c^2 Aquarii	5	−22	.023	.32
1533	π Cephei	23 5	+75	.019	.21
1532	ι Gruis	5	−46	.064	.56
1534	59 Pegasi	7	+ 8	.028	.41
1535	5 Cassiop.	9	+57	.030	.31
1536	φ Aquarii	10	− 7	.016	.22
1537	ψ Aquarii	23 11	−10	.020	.29
1539	γ Tucanæ	12	−59	.044	.38
1540	γ Piscium	13	+ 3	.013	.16
1542	γ Sculpt.	14	−33	.053	.46
1544	ο Cephei	15	+68	.025	.25
1546	τ Pegasi	23 16	+23	.020	.25
1548	b^1 Aquarii	18	−21	.024	.32
1550	4 Cassiop.	21	+62	.022	.23
1549	υ Pegasi	21	+23	.020	.24
1552	κ Piscium	22	+ 1	.014	.19
1553	θ Piscium	23 24	+ 6	.019	.26
1555	70 Pegasi	25	+12	.022	.26
1559	39 H. Cephei	28	+87	.018	.21
1558	β Sculpt.	28	−38	.046	.47
1561	72 Pegasi	30	+31	.026	.30
1567	λ Androm.	23 33	+46	.016	.20
1568	ι Androm.	34	+43	.021	.21
1569	ι Piscium	35	+ 5	.013	.19
1570	γ Cephei	36	+77	.014	.14
1572	κ Androm.	36	+44	.020	.23
1574	ω^2 Aquarii	23 38	−15	.023	.37
1576	i^1 Aquarii	40	−19	.022	.27
1577	ψ Androm.	42	+46	.023	.39
1580	41 H. Cephei	44	+67	.024	.27
1581	δ Sculpt.	44	−29	.024	.33
1582	γ^1 Octantis	23 47	−83	.032	.29
1583	φ Pegasi	48	+19	.023	.31
1586	ρ Cassiop.	50	+57	.032	.28
1587	Gr. 4163	51	+74	.032	.37
1592	ω Piscium	55	+ 6	.013	.16
1593	ε Tucanæ	23 55	−66	.071	.60
1595	30 Piscium	57	− 7	.022	.28
1596	2 Ceti	23 59	−18	.018	.23

FOR WASHINGTON MEAN AND APPARENT NOON.

Date.	Apparent Right Ascension.		Apparent Declination.		Hourly Motion.		Equation of Time for Apparent Noon.	Semi-diameter at Apparent Noon.	Sidereal Time of Semid. Passing Merid.	Sidereal Time of Mean Noon.
	Mean Noon.	App. Noon.	Mean Noon.	App. Noon.	Right Ascen.	Declination.				
	h m s	s	° ′ ″	″	s	″	m s	′ ″	m s	h m s
Jan. 1	18 43 17.53	18.15	−23 4 46.2	45.6	11.046	+11.43	+ 3 19.43	16 17.89	1 11.08	18 39 58.18
2	18 47 42.49	43.19	22 59 58.3	57.5	11.032	12.57	3 47.82	16 17.90	1 11.04	18 43 54.74
3	18 52 7.11	7.89	22 54 42.7	41.8	11.018	13.71	4 15.90	16 17.90	1 10.99	18 47 51.30
4	18 56 31.37	32.23	22 48 59.8	58.7	11.003	14.85	4 43.60	16 17.91	1 10.94	18 51 47.86
5	19 0 55.24	56.18	22 42 49.8	48.5	10.986	15.98	5 10.92	16 17.90	1 10.89	18 55 44.42
6	19 5 18.69	19.71	−22 36 12.8	11.3	10.968	+17.10	+ 5 37.83	16 17.89	1 10.83	18 59 40.97
7	19 9 41.71	42.82	22 29 9.0	7.3	10.949	18.21	6 4.30	16 17.86	1 10.76	19 3 37.53
8	19 14 4.28	5.47	22 21 38.7	36.6	10.930	19.31	6 30.31	16 17.83	1 10.69	19 7 34.09
9	19 18 26.36	27.62	22 13 42.0	39.6	10.910	20.40	6 55.83	16 17.79	1 10.63	19 11 30.65
10	19 22 47.94	49.27	22 5 19.1	16.4	10.888	21.49	7 20.85	16 17.75	1 10.56	19 15 27.21
11	19 27 8.98	10.38	−21 56 30.2	27.3	10.865	+22.57	+ 7 45.34	16 17.71	1 10.48	19 19 23.77
12	19 31 29.48	30.95	21 47 15.6	12.4	10.842	23.64	8 9.28	16 17.66	1 10.40	19 23 20.32
13	19 35 49.39	50.93	21 37 35.5	32.1	10.817	24.69	8 32.65	16 17.60	1 10.32	19 27 16.88
14	19 40 8.70	10.30	21 27 30.3	26.6	10.791	25.73	8 55.41	16 17.54	1 10.24	19 31 13.44
15	19 44 27.38	29.04	21 16 60.2	56.1	10.764	26.77	9 17.54	16 17.47	1 10.15	19 35 10.00
16	19 48 45.42	47.14	−21 6 5.5	1.0	10.737	+27.79	+ 9 39.02	16 17.40	1 10.06	19 39 6.56
17	19 53 2.79	4.57	20 54 46.6	41.7	10.709	28.79	9 59.82	16 17.32	1 9.96	19 43 3.12
18	19 57 19.46	21.30	20 42 63.7	58.5	10.680	29.78	10 19.93	16 17.24	1 9.86	19 46 59.67
19	20 1 35.43	37.32	20 30 57.1	51.7	10.650	30.76	10 39.34	16 17.16	1 9.76	19 50 56.23
20	20 5 50.66	52.60	20 18 27.2	21.5	10.619	31.72	10 58.02	16 17.08	1 9.66	19 54 52.79
21	20 10 5.14	7.13	−20 5 34.4	28.3	10.588	+32.67	+11 15.95	16 16.99	1 9.55	19 58 49.35
22	20 14 18.86	20.89	19 52 19.1	12.6	10.556	33.60	11 33.10	16 16.90	1 9.45	20 2 45.91
23	20 18 31.81	33.88	19 38 41.6	34.8	10.523	34.51	11 49.48	16 16.80	1 9.34	20 6 42.46
24	20 22 43.97	46.08	19 24 42.2	35.1	10.490	35.42	12 5.08	16 16.70	1 9.24	20 10 39.02
25	20 26 55.32	57.47	19 10 21.4	13.9	10.456	36.31	12 19.87	16 16.60	1 9.13	20 14 35.58
26	20 31 5.85	8.03	−18 55 39.5	31.7	10.422	+37.18	+12 33.85	16 16.49	1 9.02	20 18 32.14
27	20 35 15.57	17.77	18 40 37.0	28.9	10.388	38.03	12 47.00	16 16.38	1 8.91	20 22 28.69
28	20 39 24.46	26.69	18 25 14.2	5.8	10.353	38.87	12 59.32	16 16.26	1 8.80	20 26 25.25
29	20 43 32 51	34.77	18 9 31.6	22.9	10.319	39.68	13 10.81	16 16.13	1 8.69	20 30 21.81
30	20 47 39.72	42.00	17 53 29.5	20.5	10.284	40.48	13 21.46	16 16.00	1 8.58	20 34 18.36
31	20 51 46.11	48.41	−17 36 68.3	59.1	10.249	+41.27	+13 31.28	16 15.87	1 8.46	20 38 14.92
Feb. 1	20 55 51.66	53.99	17 20 28.4	18.9	10.214	42.04	13 40.26	16 15.73	1 8.34	20 42 11.48
2	20 59 56.38	58.73	17 3 30.3	20.4	10.180	42.80	13 48.42	16 15.59	1 8.23	20 46 8.03
3	21 4 0.28	2.64	16 46 14.2	4.1	10.146	43.54	13 55.76	16 15.44	1 8.11	20 50 4.59
4	21 8 3.37	5.74	16 28 40.7	30.4	10.112	44.26	14 2.28	16 15.29	1 8.00	20 54 1.15
5	21 12 5.66	8.04	−16 10 50.0	39.5	10.079	+44.96	+14 8.01	16 15.13	1 7.88	20 57 57.70
6	21 16 7.14	9.53	15 52 42.5	31.7	10.045	45.66	14 12.94	16 14.96	1 7.77	21 1 54.26
7	21 20 7.82	10.21	15 34 18.6	7.6	10.012	46.33	14 17.06	16 14.79	1 7.65	21 5 50.82
8	21 24 7.72	10.11	15 15 38.8	27.5	9.979	46.99	14 20.39	16 14.62	1 7.54	21 9 47.37
9	21 28 6.84	9.23	14 56 43.4	31.8	9.947	47.63	14 22.94	16 14.44	1 7.42	21 13 43.93
10	21 32 5.18	7.57	−14 37 32.8	21.1	9.915	+48.25	+14 24.72	16 14.26	1 7.31	21 17 40.48
11	21 36 2.76	5.14	14 17 67.3	55.6	9.883	48.86	14 25.73	16 14.07	1 7.20	21 21 37.04
12	21 39 59.58	61.95	13 58 27.6	15.7	9.851	49.44	14 25.98	16 13.88	1 7.09	21 25 33.59
13	21 43 55.64	58.01	13 38 34.0	21.9	9.820	50.01	14 25.48	16 13.68	1 6.98	21 29 30.15
14	21 47 50.95	53.31	13 18 26.8	14.6	9.789	50.57	14 24.23	16 13.48	1 6.87	21 33 26.71
15	21 51 45.52	47.87	−12 57 66.6	54.3	9.759	+51.10	+14 22.24	16 13.28	1 6.76	21 37 23.26
16	21 55 39.36	41.69	−12 37 33.7	21.4	9.729	+51.62	+14 19.52	16 13.08	1 6.66	21 41 19.82

NOTE.—For mean time interval of semidiameter passing meridian, subtract 0^{s}.19 from the sidereal interval.

FOR WASHINGTON MEAN AND APPARENT NOON.

Date.	Apparent Right Ascension.		Apparent Declination.		Hourly Motion.		Equation of Time for Apparent Noon.	Semi-diameter at Apparent Noon.	Sidereal Time of Semid. Passing Merid.	Sidereal Time of Mean Noon.
	Mean Noon.	App. Noon.	Mean Noon.	App. Noon.	Right Ascen.	Decli-nation.				
	h m s	s	° ′ ″	″	s	″	m s	′ ″	m s	h m s
eb. 16	21 55 39.36	41.69	−12 37 33.7	21.4	9.729	+51.62	+14 19.52	16 13.08	1 6.66	21 41 19.82
17	21 59 32.49	34.80	12 16 48.6	36.2	9.699	52.12	14 16.09	16 12.88	1 6.56	21 45 16.37
18	22 3 24.90	27.20	11 55 51.7	39.3	9.669	52.61	14 11.95	16 12.67	1 6.46	21 49 12.93
19	22 7 16.61	18.89	11 34 43.5	31.1	9.640	53.07	14 7.10	16 12.46	1 6.36	21 53 9.48
20	22 11 7.63	9.88	11 13 24.4	11.9	9.611	53.51	14 1.56	16 12.25	1 6.26	21 57 6.04
21	22 14 57.97	60.19	−10 51 54.7	42.2	9.583	+53.94	+13 55.33	16 12.03	1 6.16	22 1 2.59
22	22 18 47.64	49.84	10 30 14.9	2.5	9.556	54.36	13 48.44	16 11.82	1 6.06	22 4 59.15
23	22 22 36.65	38.83	10 8 25.5	13.3	9.529	54.75	13 40.89	16 11.60	1 5.97	22 8 55.70
24	22 26 25.02	27.17	9 46 27.0	14.9	9.502	55.11	13 32.70	16 11.38	1 5.88	22 12 52.26
25	22 30 12.76	14.88	9 24 19.8	7.7	9.476	55.47	13 23.88	16 11.16	1 5.79	22 16 48.81
26	22 33 59.88	61.97	− 9 1 64.3	52.2	9.450	+55.81	+13 14.45	16 10.94	1 5.71	22 20 45.36
27	22 37 46.41	48.47	8 39 40.9	28.8	9.425	56.14	13 4.42	16 10.71	1 5.62	22 24 41.92
28	22 41 32.37	34.40	8 16 69.9	57.9	9.402	56.45	12 53.82	16 10.47	1 5.54	22 28 38.48
29	22 45 17.77	19.76	7 54 31.8	19.9	9.380	56.74	12 42.65	16 10.24	1 5.46	22 32 35.03
ar. 1	22 49 2.63	4.58	7 31 47.0	35.1	9.359	57.00	12 30.95	16 10.00	1 5.39	22 36 31.58
2	22 52 46.97	48.89	− 7 8 55.8	44.0	9.338	+57.25	+12 18.74	16 9.76	1 5.32	22 40 28.14
3	22 56 30.82	32.71	6 45 58.6	46.9	9.318	57.50	12 6.03	16 9.52	1 5.25	22 44 24.69
4	23 0 14.21	16.06	6 22 55.6	44.1	9.299	57.73	11 52.86	16 9.27	1 5.19	22 48 21.25
5	23 3 57.16	58.96	5 59 47.2	35.9	9.280	57.94	11 39.25	16 9.02	1 5.13	22 52 17.80
6	23 7 39.68	41.44	5 36 33.9	22.8	9.264	58.14	11 25.22	16 8.76	1 5.07	22 56 14.35
7	23 11 21.80	23.52	− 5 13 16.2	5.3	9.248	+58.33	+11 10.79	16 8.50	1 5.01	23 0 10.91
8	23 15 3.54	5.22	4 49 54.2	43.5	9.232	58.49	10 55.98	16 8.23	1 4.95	23 4 7.46
9	23 18 44.93	46.57	4 26 28.3	17.8	9.217	58.65	10 40.81	16 7.96	1 4.90	23 8 4.01
10	23 22 25.98	27.58	4 2 58.9	48.6	9.204	58.79	10 25.31	16 7.70	1 4.84	23 12 0.57
11	23 26 6.71	8.28	3 39 26.3	16.3	9.191	58.91	10 9.49	16 7.43	1 4.79	23 15 57.12
12	23 29 47.15	48.67	− 3 15 51.1	41.3	9.179	+59.02	+ 9 53.37	16 7.16	1 4.74	23 19 53.68
13	23 33 27.31	28.78	2 52 13.5	4.0	9.168	59.11	9 36.97	16 6.89	1 4.70	23 23 50.24
14	23 37 7.20	8.63	2 28 33.9	24.6	9.158	59.18	9 20.30	16 6.62	1 4.66	23 27 46.79
15	23 40 46.85	48.23	2 4 52.7	43.7	9.148	59.24	9 3.40	16 6.35	1 4.62	23 31 43.34
16	23 44 26.28	27.62	1 41 10.3	1.6	9.139	59.29	8 46.28	16 6.08	1 4.59	23 35 39.89
17	23 48 5.51	6.81	− 1 17 27.1	18.7	9.130	+59.31	+ 8 28.96	16 5.81	1 4.56	23 39 36.44
18	23 51 44.55	45.81	0 53 43.4	35.4	9.123	59.32	8 11.45	16 5.54	1 4.54	23 43 33.00
19	23 55 23.42	24.63	0 29 59.8	52.0	9.117	59.31	7 53.77	16 5.27	1 4.52	23 47 29.55
20	23 59 2.14	3.30	− 0 6 16.5	9.0	9.111	59.28	7 35.94	16 5.00	1 4.50	23 51 26.10
21	0 2 40.72	41.83	+ 0 17 26.1	33.3	9.105	59.24	7 17.97	16 4.73	1 4.48	23 55 22.66
22	0 6 19.18	20.24	+ 0 41 7.5	14.4	9.100	+59.19	+ 6 59.88	16 4.47	1 4.46	23 59 19.21
23	0 9 57.54	58.55	1 4 47.4	54.0	9.096	59.12	6 41.69	16 4.20	1 4.45	0 3 15.77
24	0 13 35.82	36.78	1 28 25.3	31.6	9.094	59.03	6 23.42	16 3.93	1 4.44	0 7 12.32
25	0 17 14.04	14.96	1 52 1.0	7.0	9.092	58.93	6 5.09	16 3.66	1 4.44	0 11 8.87
26	0 20 52.22	53.10	2 15 34.0	39.7	9.090	58.81	5 46.71	16 3.39	1 4.43	0 15 5.43
27	0 24 30.36	31.21	+ 2 39 4.1	9.4	9.089	+58.68	+ 5 28.30	16 3.11	1 4.43	0 19 1.98
28	0 28 8.49	9.30	3 2 30.7	35.8	9.089	58.54	5 9.88	16 2.84	1 4.43	0 22 58.53
29	0 31 46.63	47.39	3 25 53.6	58.4	9.091	58.37	4 51.49	16 2.56	1 4.44	0 26 55.09
30	0 35 24.82	25.52	3 49 12.6	17.0	9.093	58.20	4 33.13	16 2.29	1 4.45	0 30 51.64
31	0 39 3.08	3.73	4 12 27.2	31.3	9.096	58.02	4 14.83	16 2.01	1 4.46	0 34 48.20
r. 1	0 42 41.42	42.02	+ 4 35 37.2	41.0	9.100	+57.81	+ 3 56.62	16 1.74	1 4.48	0 38 44.75
2	0 46 19.86	20.41	+ 4 58 42.1	45.7	9.105	+57.59	+ 3 38.52	16 1.46	1 4.50	0 42 41.

Note.—For mean time interval of semidiameter passing meridian, subtract 0s.18 from the sidereal interval

SOLAR EPHEMERIS, 1912.

FOR WASHINGTON MEAN AND APPARENT NOON.

Date.	Apparent Right Ascension.		Apparent Declination.		Hourly Motion.		Equation of Time for Apparent Noon.	Semi-diameter at Apparent Noon.	Sidereal Time of Semid. Passing Merid.	Sidereal Time of Mean Noon.
	Mean Noon.	App. Noon.	Mean Noon.	App. Noon.	Right Ascen.	Decli-nation.				
	h m s	s	° ′ ″	″	s	″	m s	′ ″	m s	h m s
Apr. 1	0 42 41.42	42.02	+ 4 35 37.2	41.0	9.100	+57.81	+3 56.62	16 1.74	1 4.48	0 38 44.75
2	0 46 19.86	20.41	4 58 42.1	45.7	9.105	57.59	3 38.52	16 1.46	1 4.50	0 42 41.30
3	0 49 58.44	58.95	5 21 41.8	45.1	9.110	57.37	3 20.56	16 1.18	1 4.52	0 46 37.86
4	0 53 37.18	37.65	5 44 35.9	38.8	9.117	57.12	3 2.75	16 0.90	1 4.54	0 50 34.41
5	0 57 16.10	16.52	6 7 24.1	26.6	9.125	56.87	2 45.12	16 0.62	1 4.57	0 54 30.96
6	1 0 55.21	55.58	+ 6 30 6.1	8.4	9.134	+56.61	+2 27.68	16 0.34	1 4.60	0 58 27.52
7	1 4 34.53	34.86	6 52 41.5	43.6	9.144	56.33	2 10.45	16 0.06	1 4.63	1 2 24.07
8	1 8 14.09	14.38	7 15 10.1	11.8	9.154	56.03	1 53.46	15 59.78	1 4.67	1 6 20.63
9	1 11 53.92	54.16	7 37 31.3	32.7	9.165	55.72	1 36.73	15 59.50	1 4.71	1 10 17.18
10	1 15 34.02	34.22	7 59 45.0	46.1	9.176	55.40	1 20.27	15 59.22	1 4.75	1 14 13.74
11	1 19 14.40	14.56	+ 8 21 50.7	51.6	9.189	+55.07	+1 4.10	15 58.94	1 4.79	1 18 10.29
12	1 22 55.09	55.21	8 43 48.1	48.9	9.202	54.71	0 48.24	15 58.67	1 4.84	1 22 6.84
13	1 26 36.10	36.18	9 5 37.0	37.5	9.216	54.35	0 32.69	15 58.39	1 4.88	1 26 3.40
14	1 30 17.45	17.48	9 27 17.0	17.2	9.230	53.97	0 17.48	15 58.12	1 4.93	1 29 59.95
15	1 33 59.14	59.14	9 48 47.6	47.6	9.244	53.57	+0 2.62	15 57.85	1 4.98	1 33 56.51
16	1 37 41.19	41.17	+10 10 8.5	8.3	9.259	+53.16	−0 11.87	15 57.58	1 5.03	1 37 53.06
17	1 41 23.61	23.57	10 31 19.3	18.9	9.275	52.74	0 25.99	15 57.31	1 5.08	1 41 49.62
18	1 45 6.42	6.34	10 52 19.7	19.1	9.292	52.29	0 39.74	15 57.05	1 5.13	1 45 46.17
19	1 48 49.63	49.50	11 13 9.4	8.6	9.309	51.84	0 53.09	15 56.79	1 5.19	1 49 42.73
20	1 52 33.24	33.07	11 33 47.9	46.9	9.326	51.37	1 6.04	15 56.54	1 5.25	1 53 39.28
21	1 56 17.26	17.06	+11 54 14.9	13.7	9.343	+50.88	−1 18.57	15 56.29	1 5.32	1 57 35.84
22	2 0 1.70	1.47	12 14 30.1	28.7	9.361	50.38	1 30.68	15 56.04	1 5.39	2 1 32.39
23	2 3 46.58	46.32	12 34 33.1	31.6	9.379	49.87	1 42.36	15 55.79	1 5.45	2 5 28.95
24	2 7 31.90	31.61	12 54 23.6	22.0	9.398	49.33	1 53.59	15 55.54	1 5.52	2 9 25.50
25	2 11 17.68	17.36	13 13 61.2	59.4	9.417	48.79	2 4.37	15 55.29	1 5.59	2 13 22.06
26	2 15 3.92	3.57	+13 33 25.6	23.8	9.437	+48.23	−2 14.68	15 55.05	1 5.66	2 17 18.61
27	2 18 50.64	50.26	13 52 36.6	34.7	9.457	47.67	2 24.50	15 54.81	1 5.74	2 21 15.17
28	2 22 37.85	37.45	14 11 33.8	31.8	9.478	47.09	2 33.84	15 54.57	1 5.81	2 25 11.72
29	2 26 25.57	25.15	14 30 17.0	14.9	9.499	46.50	2 42.68	15 54.33	1 5.89	2 29 8.28
30	2 30 13.81	13.36	14 48 45.8	43.7	9.521	45.90	2 51.01	15 54.09	1 5.97	2 33 4.83
May 1	2 34 2.57	2.09	+15 6 60.0	57.8	9.543	+45.28	−2 58.81	15 53.85	1 6.05	2 37 1.39
2	2 37 51.86	51.37	15 24 59.3	57.0	9.566	44.65	3 6.07	15 53.61	1 6.13	2 40 57.95
3	2 41 41.71	41.20	15 42 43.4	41.0	9.589	44.01	3 12.78	15 53.38	1 6.21	2 44 54.50
4	2 45 32.12	31.59	16 0 11.9	9.5	9.612	43.36	3 18.93	15 53.14	1 6.29	2 48 51.06
5	2 49 23.09	22.55	16 17 24.6	22.2	9.636	42.70	3 24.51	15 52.91	1 6.37	2 52 47.61
6	2 53 14.64	14.08	+16 34 21.3	18.9	9.660	+42.02	−3 29.52	15 52.68	1 6.45	2 56 44.17
7	2 57 6.78	6.20	16 50 61.5	59.1	9.684	41.33	3 33.95	15 52.45	1 6.53	3 0 40.73
8	3 0 59.49	58.90	17 7 25.0	22.6	9.708	40.63	3 37.79	15 52.23	1 6.61	3 4 37.28
9	3 4 52.79	52.19	17 23 31.4	29.0	9.733	39.90	3 41.04	15 52.01	1 6.69	3 8 33.84
10	3 8 46.68	46.08	17 39 20.5	18.1	9.757	39.17	3 43.70	15 51.79	1 6.77	3 12 30.39
11	3 12 41.16	40.56	+17 54 52.0	49.6	9.782	+38.44	−3 45.78	15 51.57	1 6.85	3 16 26.95
12	3 16 36.23	35.63	18 10 5.6	3.2	9.807	37.69	3 47.27	15 51.36	1 6.93	3 20 23.51
13	3 20 31.90	31.29	18 24 61.0	58.7	9.831	36.92	3 48.16	15 51.15	1 7.01	3 24 20.07
14	3 24 28.16	27.54	18 39 37.9	35.6	9.856	36.14	3 48.46	15 50.94	1 7.10	3 28 16.62
15	3 28 25.00	24.37	18 53 55.9	53.7	9.880	35.35	3 48.18	15 50.74	1 7.18	3 32 13.18
16	3 32 22.41	21.78	+19 7 54.8	52.7	9.904	+34.55	−3 47.33	15 50.54	1 7.26	3 36 9.74
17	3 36 20.39	19.76	+19 21 34.3	32.2	9.927	+33.73	−3 45.91	15 50.35	1 7.34	3 40 6.29

NOTE.—For mean time interval of semidiameter passing meridian, subtract $0^{s}.18$ from the sidereal interval.

SOLAR EPHEMERIS, 1912.

FOR WASHINGTON MEAN AND APPARENT NOON.

Date.	Apparent Right Ascension.		Apparent Declination.		Hourly Motion.		Equation of Time for Apparent Noon.	Semi-diameter at Apparent Noon.	Sidereal Time of Semid. Passing Merid.	Sidereal Time of Mean Noon.
	Mean Noon.	App. Noon.	Mean Noon.	App. Noon.	Right Ascen.	Declination.				
	h m s	s	° ′ ″	″	s	″	m s	′ ″	m s	h m s
lay 17	3 36 20.39	19.76	+19 21 34.3	32.2	9.927	+33.73	−3 45.91	15 50.35	1 7.34	3 40 6.29
18	3 40 18.92	18.31	19 34 54.0	52.0	9.950	32.90	3 43.93	15 50.16	1 7.42	3 44 2.85
19	3 44 18.00	17.40	19 47 53.7	51.7	9.973	32.06	3 41.41	15 49.98	1 7.50	3 47 59.41
20	3 48 17.61	17.03	20 0 33.1	31.2	9.995	31.21	3 38.36	15 49.80	1 7.58	3 51 55.97
21	3 52 17.75	17.18	20 12 52.0	50.2	10.016	30.35	3 34.78	15 49.62	1 7.65	3 55 52.52
22	3 56 18.42	17.84	+20 24 50.0	48.3	10.037	+29.48	−3 30.67	15 49.45	1 7.73	3 59 49.08
23	4 0 19.59	19.01	20 36 27.0	25.3	10.058	28.60	3 26.06	15 49.28	1 7.80	4 3 45.64
24	4 4 21.25	20.68	20 47 42.7	41.1	10.079	27.71	3 20.96	15 49.12	1 7.87	4 7 42.20
25	4 8 23.40	22.84	20 58 36.9	35.4	10.099	26.81	3 15.37	15 48.96	1 7.94	4 11 38.75
26	4 12 26.02	25.48	21 9 9.4	8.0	10.119	25.90	3 9.31	15 48.80	1 8.01	4 15 35.31
27	4 16 29.12	28.60	+21 19 20.0	18.8	10.138	+24.98	−3 2.77	15 48.65	1 8.08	4 19 31.87
28	4 20 32.68	32.18	21 29 8.6	7.4	10.157	24.05	2 55.77	15 48.50	1 8.14	4 23 28.43
29	4 24 36.69	36.21	21 38 34.8	33.7	10.176	23.12	2 48.32	15 48.35	1 8.20	4 27 24.98
30	4 28 41.13	40.67	21 47 38.5	37.5	10.194	22.18	2 40.42	15 48.20	1 8.26	4 31 21.54
31	4 32 46.00	45.57	21 56 19.6	18.8	10.212	21.24	2 32.10	15 48.06	1 8.32	4 35 18.10
ne 1	4 36 51.29	50.89	+22 4 37.9	37.2	10.229	+20.28	−2 23.37	15 47.92	1 8.38	4 39 14.66
2	4 40 56.98	56.61	22 12 33.2	32.6	10.245	19.32	2 14.24	15 47.78	1 8.44	4 43 11.22
3	4 45 3.06	2.72	22 20 5.3	4.8	10.261	18.35	2 4.72	15 47.64	1 8.50	4 47 7.77
4	4 49 9.53	9.20	22 27 14.1	13.6	10.276	17.38	1 54.82	15 47.51	1 8.55	4 51 4.33
5	4 53 16.36	16.05	22 33 59.4	58.9	10.291	16.40	1 44.55	15 47.38	1 8.60	4 55 0.89
6	4 57 23.53	23.24	+22 40 21.1	20.6	10.305	+15.41	−1 33.94	15 47.25	1 8.65	4 58 57.45
7	5 1 31.02	30.77	22 46 19.0	18.6	10.319	14.42	1 23.00	15 47.13	1 8.69	5 2 54.01
8	5 5 38.82	38.62	22 51 53.0	52.7	10.331	13.42	1 11.75	15 47.01	1 8.73	5 6 50.57
9	5 9 46.92	46.75	22 57 2.9	2.6	10.342	12.41	1 0.21	15 46.90	1 8.76	5 10 47.12
10	5 13 55.29	55.15	23 1 48.6	48.4	10.353	11.40	0 48.41	15 46.79	1 8.79	5 14 43.68
11	5 18 3.90	3.80	+23 6 10.1	10.0	10.363	+10.39	−0 36.36	15 46.69	1 8.82	5 18 40.24
12	5 22 12.73	12.66	23 10 7.2	7.2	10.372	9.38	0 24.09	15 46.60	1 8.84	5 22 36.80
13	5 26 21.75	21.72	23 13 39.8	39.8	10.380	8.35	−0 11.62	15 46.51	1 8.86	5 26 33.36
14	5 30 30.95	30.95	23 16 47.8	47.8	10.386	7.32	+0 1.02	15 46.42	1 8.88	5 30 29.92
15	5 34 40.28	40.32	23 19 31.1	31.1	10.391	6.29	0 13.80	15 46.34	1 8.90	5 34 26.48
16	5 38 49.73	49.80	+23 21 49.7	49.7	10.395	+ 5.26	+0 26.69	15 46.26	1 8.91	5 38 23.03
17	5 42 59.26	59.37	23 23 43.5	43.5	10.398	4.23	0 39.67	15 46.19	1 8.92	5 42 19.59
18	5 47 8.85	9.00	23 25 12.5	12.5	10.400	3.19	0 52.70	15 46.12	1 8.93	5 46 16.15
19	5 51 18.47	18.65	23 26 16.7	16.7	10.401	2.16	1 5.76	15 46.07	1 8.93	5 50 12.71
20	5 55 28.09	28.30	23 26 56.0	56.0	10.401	1.12	1 18.82	15 46.02	1 8.94	5 54 9.27
21	5 59 37.69	37.94	+23 27 10.5	10.5	10.399	+ 0.09	+1 31.86	15 45.97	1 8.94	5 58 5.83
22	6 3 47.23	47.53	23 27 0.2	0.2	10.396	− 0.94	1 44.85	15 45.93	1 8.93	6 2 2.39
23	6 7 56.70	57.04	23 26 25.1	25.1	10.392	1.98	1 57.77	15 45.89	1 8.93	6 5 58.94
24	6 12 6.08	6.45	23 25 25.2	25.2	10.388	3.01	2 10.59	15 45.85	1 8.92	6 9 55.50
25	6 16 15.34	15.75	23 24 0.6	0.5	10.383	4.04	2 23.30	15 45.81	1 8.91	6 13 52.06
26	6 20 24.47	24.92	+23 22 11.4	11.2	10.378	− 5.07	+2 35.88	15 45.78	1 8.89	6 17 48.62
27	6 24 33.45	33.94	23 19 57.6	57.3	10.371	6.09	2 48.31	15 45.75	1 8.87	6 21 45.18
28	6 28 42.26	42.78	23 17 19.2	18.9	10.363	7.11	3 0.56	15 45.73	1 8.84	6 25 41.74
29	6 32 50.88	51.43	23 14 16.4	16.0	10.354	8.13	3 12.62	15 45.71	1 8.81	6 29 38.30
30	6 36 59.29	59.87	23 10 49.2	48.7	10.345	9.14	3 24.47	15 45.69	1 8.78	6 33 34.86
ly 1	6 41 7.47	8.08	+23 6 57.6	57.0	10.336	−10.15	+3 36.08	15 45.68	1 8.75	6 37 31.41
2	6 45 15.39	16.04	+23 2 41.8	41.1	10.325	−11.16	+3 47.44	15 45.67	1 8.71	6 41 2

NOTE.—For mean time interval of semidiameter passing meridian, subtract $0^{s}.19$ from the sidereal interv

FOR WASHINGTON MEAN AND APPARENT NOON.

Date.	Apparent Right Ascension.		Apparent Declination.		Hourly Motion.		Equation of Time for Apparent Noon.	Semi-diameter at Apparent Noon.	Sidereal Time of Semid Passing Merid.	Sidereal Time of Mean Noon.
	Mean Noon.	App. Noon.	Mean Noon.	App. Noon.	Right Ascen.	Declination.				
	h m s	s	° ′ ″	″	s	″	m s	′ ″	m s	h m s
July 1	6 41 7.47	8.08	+23 6 57.6	57.0	10.336	−10.15	+3 36.08	15 45.68	1 8.75	6 37 31.41
2	6 45 15.39	16.04	23 2 41.8	41.1	10.325	11.16	3 47.44	15 45.67	1 8.71	6 41 27.97
3	6 49 23.04	23.73	22 58 1.9	1.1	10.313	12.16	3 58.55	15 45.66	1 8.67	6 45 24.53
4	6 53 30.42	31.14	22 52 58.1	57.2	10.301	13.16	4 9.37	15 45.66	1 8.63	6 49 21.09
5	6 57 37.50	38.24	22 47 30.4	29.4	10.288	14.15	4 19.88	15 45.66	1 8.58	6 53 17.65
6	7 1 44.25	45.02	+22 41 38.9	37.8	10.274	−15.14	+4 30.08	15 45.67	1 8.53	6 57 14.20
7	7 5 50.67	51.46	22 35 23.8	22.6	10.260	16.12	4 39.94	15 45.67	1 8.48	7 1 10.76
8	7 9 56.74	57.55	22 28 45.1	43.8	10.245	17.10	4 49.45	15 45.68	1 8.43	7 5 7.32
9	7 14 2.43	3.27	22 21 43.0	41.6	10.228	18.07	4 58.58	15 45.70	1 8.37	7 9 3.88
10	7 18 7.72	8.60	22 14 17.8	16.2	10.211	19.04	5 7.32	15 45.73	1 8.31	7 13 0.44
11	7 22 12.60	13.51	+22 6 29.5	27.8	10.194	−19.99	+5 15.65	15 45.76	1 8.25	7 16 57.00
12	7 26 17.06	17.99	21 58 18.5	16.6	10.176	20.93	5 23.55	15 45.79	1 8.19	7 20 53.55
13	7 30 21.07	22.01	21 49 44.8	42.8	10.157	21.87	5 31.00	15 45.83	1 8.12	7 24 50.11
14	7 34 24.61	25.57	21 40 48.5	46.4	10.137	22.80	5 37.98	15 45.88	1 8.05	7 28 46.67
15	7 38 27.66	28.63	21 31 29.9	27.7	10.116	23.73	5 44.47	15 45.93	1 7.98	7 32 43.23
16	7 42 30.20	31.18	+21 21 49.4	47.0	10.094	−24.64	+5 50.44	15 45.99	1 7.91	7 36 39.79
17	7 46 32.21	33.21	21 11 47.0	44.5	10.072	25.55	5 55.89	15 46.05	1 7.84	7 40 36.34
18	7 50 33.68	34.69	21 1 23.2	20.6	10.049	26.44	6 0.80	15 46.11	1 7.76	7 44 32.90
19	7 54 34.60	35.62	20 50 38.1	35.4	10.026	27.32	6 5.15	15 46.18	1 7.69	7 48 29.46
20	7 58 34.95	35.97	20 39 31.9	29.1	10.002	28.19	6 8.94	15 46.26	1 7.61	7 52 26.02
21	8 2 34.72	35.74	+20 28 4.8	1.9	9.978	−29.05	+6 12.15	15 46.35	1 7.53	7 56 22.58
22	8 6 33.90	34.93	20 16 17.2	14.1	9.954	29.90	6 14.78	15 46.44	1 7.45	8 0 19.13
23	8 10 32.49	33.53	20 4 9.3	6.0	9.929	30.75	6 16.82	15 46.53	1 7.37	8 4 15.69
24	8 14 30.49	31.53	19 51 41.5	38.1	9.905	31.58	6 18.26	15 46.62	1 7.28	8 8 12.25
25	8 18 27.90	28.94	19 38 53.9	50.5	9.880	32.39	6 19.10	15 46.72	1 7.19	8 12 8.80
26	8 22 24.70	25.74	+19 25 46.7	43.3	9.854	−33.20	+6 19.34	15 46.82	1 7.10	8 16 5.36
27	8 26 20.90	21.94	19 12 20.3	16.7	9.829	34.00	6 18.98	15 46.93	1 7.01	8 20 1.92
28	8 30 16.50	17.53	18 58 34.9	31.2	9.804	34.78	6 18.02	15 47.04	1 6.93	8 23 58.48
29	8 34 11.49	12.51	18 44 30.8	27.0	9.779	35.55	6 16.45	15 47.15	1 6.84	8 27 55.03
30	8 38 5.88	6.89	18 30 8.1	4.3	9.754	36.31	6 14.28	15 47.26	1 6.76	8 31 51.59
31	8 41 59.67	60.66	+18 15 27.2	23.4	9.729	−37.07	+6 11.52	15 47.38	1 6.68	8 35 48.15
Aug. 1	8 45 52.87	53.84	18 0 28.5	24.7	9.704	37.82	6 8.16	15 47.50	1 6.60	8 39 44.70
2	8 49 45.48	46.43	17 45 12.2	8.3	9.679	38.54	6 4.20	15 47.62	1 6.51	8 43 41.26
3	8 53 37.49	38.43	17 29 38.4	34.5	9.655	39.26	5 59.65	15 47.75	1 6.43	8 47 37.82
4	8 57 28.91	29.84	17 13 47.5	43.6	9.631	39.97	5 54.52	15 47.88	1 6.34	8 51 34.37
5	9 1 19.75	20.68	+16 57 39.7	35.8	9.607	−40.67	+5 48.81	15 48.01	1 6.25	8 55 30.93
6	9 5 10.02	10.94	16 41 15.4	11.5	9.583	41.35	5 42.52	15 48.14	1 6.16	8 59 27.48
7	9 8 59.71	60.61	16 24 34.8	30.9	9.559	42.02	5 35.65	15 48.28	1 6.07	9 3 24.04
8	9 12 48.83	49.71	16 7 38.2	34.3	9.535	42.68	5 28.21	15 48.43	1 5.99	9 7 20.60
9	9 16 37.38	38.24	15 50 25.9	22.1	9.511	43.33	5 20.20	15 48.57	1 5.90	9 11 17.16
10	9 20 25.37	26.20	+15 32 58.2	54.5	9.488	−43.96	+5 11.63	15 48.72	1 5.82	9 15 13.71
11	9 24 12.80	13.60	15 15 15.5	11.8	9.465	44.59	5 2.51	15 48.88	1 5.73	9 19 10.27
12	9 27 59.67	60.44	14 57 18.1	14.4	9.441	45.20	4 52.83	15 49.05	1 5.65	9 23 6.82
13	9 31 45.98	46.73	14 39 6.4	2.8	9.418	45.78	4 42.59	15 49.22	1 5.57	9 27 3.38
14	9 35 31.74	32.46	14 20 40.7	37.2	9.395	46.36	4 31.79	15 49.40	1 5.49	9 30 59.93
15	9 39 16.95	17.64	+14 1 61.2	57.8	9.372	−46.92	+4 20.44	15 49.58	1 5.42	9 34 56.49
16	9 43 1.61	2.26	+13 43 8.4	5.1	9.349	−47.47	+4 8.54	15 49.76	1 5.34	9 38 53.04

***Note.**—For mean time interval of semidiameter passing meridian, subtract $0^s.19$ from the sidereal interval.*

FOR WASHINGTON MEAN AND APPARENT NOON.

Date.	Apparent Right Ascension.		Apparent Declination.		Hourly Motion.		Equation of Time for Apparent Noon.	Semi-diameter at Apparent Noon.	Sidereal Time of Semid. Passing Merid.	Sidereal Time of Mean Noon.
	Mean Noon.	App. Noon.	Mean Noon.	App. Noon.	Right Ascen.	Declination.				
	h m s	s	° ′ ″	″	s	″	m s	′ ″	m s	h m s
ug. 16	9 43 1.61	2.26	+13 43 8.4	5.1	9.349	−47.47	+ 4 8.54	15 49.76	1 5.34	9 38 53.04
17	9 46 45.74	46.35	13 23 62.5	59.3	9.327	48.00	3 56.11	15 49.95	1 5.27	9 42 49.60
18	9 50 29.35	29.92	13 4 44.0	41.0	9.306	48.53	3 43.16	15 50.14	1 5.20	9 46 46.16
19	9 54 12.44	12.98	12 45 13.2	10.3	9.285	49.03	3 29.70	15 50.33	1 5.13	9 50 42.71
20	9 57 55.02	55.53	12 25 30.4	27.7	9.264	49.52	3 15.73	15 50.53	1 5.06	9 54 39.27
21	10 1 37.11	37.59	+12 5 35.8	33.2	9.244	−50.00	+ 3 1.27	15 50.73	1 4.99	9 58 35.82
22	10 5 18.73	19.17	11 45 29.8	27.4	9.225	50.48	2 46.34	15 50.93	1 4.93	10 2 32.38
23	10 8 59.89	60.28	11 25 12.7	10.5	9.206	50.94	2 30.94	15 51.14	1 4.86	10 6 28.93
24	10 12 40.60	40.95	11 4 44.9	42.9	9.187	51.38	2 15.09	15 51.35	1 4.80	10 10 25.49
25	10 16 20.88	21.19	10 44 6.6	4.9	9.169	51.81	1 58.81	15 51.57	1 4.74	10 14 22.04
26	10 20 0.75	1.02	+10 23 18.2	16.8	9.153	−52.23	+ 1 42.13	15 51.78	1 4.68	10 18 18.60
27	10 23 40.23	40.45	10 2 19.9	18.8	9.137	52.63	1 25.06	15 52.00	1 4.62	10 22 15.15
28	10 27 19.33	19.50	9 41 12.0	11.2	9.122	53.02	1 7.61	15 52.21	1 4.56	10 26 11.70
29	10 30 58.06	58.19	9 19 55.0	54.3	9.107	53.40	0 49.80	15 52.43	1 4.51	10 30 8.26
30	10 34 36.47	36.55	8 58 28.9	28.4	9.093	53.76	0 31.65	15 52.65	1 4.46	10 34 4.81
31	10 38 14.56	14.59	+ 8 36 54.2	53.9	9.080	−54.11	+ 0 13.19	15 52.87	1 4.41	10 38 1.37
pt. 1	10 41 52.35	52.33	8 15 11.1	11.1	9.069	54.46	− 0 5.58	15 53.10	1 4.37	10 41 57.92
2	10 45 29.85	29.79	7 53 19.9	20.2	9.058	54.79	0 24.63	15 53.32	1 4.33	10 45 54.48
3	10 49 7.10	6.99	7 31 21.0	21.6	9.047	55.11	0 43.94	15 53.55	1 4.29	10 49 51.03
4	10 52 44.10	43.94	7 9 14.6	15.5	9.037	55.41	1 3.49	15 53.78	1 4.25	10 53 47.59
5	10 56 20.87	20.66	+ 6 47 1.1	2.3	9.028	−55.70	− 1 23.26	15 54.01	1 4.22	10 57 44.14
6	10 59 57.43	57.17	6 24 40.8	42.3	9.020	55.98	1 43.24	15 54.24	1 4.18	11 1 40.69
7	11 3 33.80	33.49	6 2 13.9	15.7	9.013	56.24	2 3.42	15 54.48	1 4.15	11 5 37.25
8	11 7 10.00	9.64	5 39 40.9	43.0	9.006	56.49	2 23.77	15 54.72	1 4.12	11 9 33.80
9	11 10 46.05	45.64	5 17 2.1	4.5	8.999	56.73	2 44.28	15 54.97	1 4.10	11 13 30.36
10	11 14 21.95	21.49	+ 4 54 17.9	20.6	8.993	−56.94	− 3 4.93	15 55.22	1 4.08	11 17 26.91
11	11 17 57.71	57.20	4 31 28.5	31.6	8.988	57.15	3 25.71	15 55.47	1 4.06	11 21 23.46
12	11 21 33.35	32.79	4 8 34.4	38 0	8.983	57.34	3 46.61	15 55.73	1 4.04	11 25 20.02
13	11 25 8.90	8.28	3 45 36.1	40.0	8.979	57.51	4 7.61	15 55.99	1 4.03	11 29 16.57
14	11 28 44.36	43.69	3 22 33.7	38.0	8.976	57.67	4 28.69	15 56.25	1 4.02	11 33 13.13
15	11 32 19.76	19.04	+ 2 59 27.7	32.4	8.974	−57.82	− 4 49.84	15 56.51	1 4.01	11 37 9.68
16	11 35 55.11	54.34	2 36 18.5	23.5	8.972	57.95	5 11.04	15 56.77	1 4.01	11 41 6.23
17	11 39 30.43	29.60	2 13 6.3	11.7	8.971	58.06	5 32.27	15 57.04	1 4.01	11 45 2.79
18	11 43 5.74	4.85	1 49 51.5	57.3	8.971	58.16	5 53.51	15 57.31	1 4.01	11 48 59.34
19	11 46 41.05	40.11	1 26 34.5	40.6	8.972	58.25	6 14.74	15 57.58	1 4.02	11 52 55.89
20	11 50 16.40	15.41	+ 1 3 15.6	22.0	8.974	−58.32	− 6 35.94	15 57.85	1 4.03	11 56 52.45
21	11 53 51.81	50.76	0 39 55.1	61.8	8.976	58.38	6 57.09	15 58.13	1 4.04	12 0 49.00
22	11 57 27.29	26.19	+ 0 16 33.3	40.3	8.980	58.43	7 18.16	15 58.40	1 4.05	12 4 45.56
23	12 1 2.87	1.72	− 0 6 49.5	42.2	8.985	58.46	7 39.13	15 58.68	1 4.07	12 8 42.11
24	12 4 38.56	37.36	0 30 12.9	5.2	8.990	58.48	7 59.99	15 58.96	1 4.09	12 12 38.66
25	12 8 14.39	13.14	− 0 53 36.6	28.5	8.996	−58.49	− 8 20.71	15 59.23	1 4.12	12 16 35.22
26	12 11 50.39	49.09	1 16 60.2	51.8	9.004	58.48	8 41.26	15 59.50	1 4.15	12 20 31.77
27	12 15 26.58	25.23	1 40 23.5	14.7	9.013	58.45	9 1.62	15 59.77	1 4.18	12 24 28.32
28	12 19 2.99	1.58	2 3 46.2	37.0	9.022	58.42	9 21.76	16 0.04	1 4.21	12 28 24.88
29	12 22 39.63	38.17	2 26 67.9	58.4	9.032	58.38	9 41.67	16 0.31	1 4.24	12 32 21.43
30	12 26 16.52	15.01	− 2 50 28.3	18.5	9.043	−58.32	−10 1.31	16 0.58	1 4.27	12 36 17.98
t. 1	12 29 53.71	52.15	− 3 13 47.0	37.0	9.055	−58.24	−10 20.68	16 0.85	1 4.30	12 40 14.54

NOTE.—For mean time interval of semidiameter passing meridian, subtract $0^{s}.18$ from the sidereal interval.

SOLAR EPHEMERIS, 1912.

FOR WASHINGTON MEAN AND APPARENT NOON.

Date.		Apparent Right Ascension.		Apparent Declination.		Hourly Motion.		Equation of Time for Apparent Noon.	Semi-diameter at Apparent Noon.	Sidereal Time of Semid. Passing Merid.	Sidereal Time of Mean Noon.
		Mean Noon.	App. Noon.	Mean Noon.	App. Noon.	Right Ascen.	Decli-nation.				
		h m s	s	° ′ ″	″	s	″	m s	′ ″	m s	h m s
Oct.	1	12 29 53.71	52.15	– 3 13 47.0	37.0	9.055	–58.24	–10 20.68	16 0.85	1 4.30	12 40 14.54
	2	12 33 31.21	29.60	3 36 63.7	53.4	9.069	58.15	10 39.74	16 1.12	1 4.34	12 44 11.10
	3	12 37 9.04	7.38	4 0 18.2	7.5	9.083	58.05	10 58.47	16 1.40	1 4.38	12 48 7.65
	4	12 40 47.22	45.51	4 23 30.0	19.0	9.098	57.93	11 16.85	16 1.67	1 4.43	12 52 4.20
	5	12 44 25.76	24.00	4 46 38.8	27.6	9.115	57.80	11 34.86	16 1.94	1 4.49	12 56 0.76
	6	12 48 4.69	2.88	– 5 9 44.2	32.8	9.131	–57.65	–11 52.48	16 2.21	1 4.56	12 59 57.31
	7	12 51 44.03	42.17	5 32 45.8	34.2	9.148	57.48	12 9.69	16 2.49	1 4.63	13 3 53.86
	8	12 55 23.80	21.89	5 55 43.3	31.5	9.166	57.30	12 26.48	16 2.77	1 4.69	13 7 50.42
	9	12 59 4.01	2.06	6 18 36.2	24.2	9.185	57.10	12 42.82	16 3.05	1 4.76	13 11 46.97
	10	13 2 44.67	42.68	6 41 24.1	11.9	9.204	56.88	12 58.71	16 3.32	1 4.82	13 15 43.52
	11	13 6 25.80	23.77	– 7 3 66.7	54.2	9.224	–56.65	–13 14.14	16 3.60	1 4.89	13 19 40.08
	12	13 10 7.42	5.34	7 26 43.5	30.8	9.244	56.40	13 29.09	16 3.88	1 4.97	13 23 36.63
	13	13 13 49.54	47.41	7 49 14.2	1.3	9.266	56.14	13 43.53	16 4.16	1 5.05	13 27 33.19
	14	13 17 32.17	30.00	8 11 38.2	25.1	9.288	55.86	13 57.45	16 4.43	1 5.13	13 31 29.74
	15	13 21 15.33	13.12	8 33 55.2	42.0	9.310	55.56	14 10.84	16 4.71	1 5.21	13 35 26.30
	16	13 24 59.03	56.79	– 8 55 64.8	51.5	9.333	–55.24	–14 23.69	16 4.99	1 5.29	13 39 22.85
	17	13 28 43.30	41.02	9 17 66.6	53.2	9.357	54.91	14 35.97	16 5.27	1 5.38	13 43 19.40
	18	13 32 28.16	25.84	9 39 60.3	46.8	9.381	54.56	14 47.67	16 5.55	1 5.47	13 47 15.96
	19	13 36 13.62	11.26	10 1 45.6	31.9	9.407	54.20	14 58.78	16 5.83	1 5.56	13 51 12.51
	20	13 39 59.69	57.30	10 23 21.8	8.1	9.433	53.82	15 9.28	16 6.11	1 5.65	13 55 9.07
	21	13 43 46.39	43.97	–10 44 48.7	35.1	9.460	–53.42	–15 19.14	16 6.38	1 5.75	13 59 5.62
	22	13 47 33.74	31.29	11 5 66.0	52.4	9.487	53.01	15 28.35	16 6.65	1 5.84	14 3 2.18
	23	13 51 21.75	19.28	11 26 73.2	59.6	9.515	52.59	15 36.90	16 6.92	1 5.94	14 6 58.73
	24	13 55 10.45	7.95	11 47 70.0	56.3	9.544	52.14	15 44.76	16 7.19	1 6.04	14 10 55.29
	25	13 58 59.85	57.33	12 8 56.0	42.3	9.573	51.68	15 51.92	16 7.46	1 6.15	14 14 51.84
	26	14 2 49.97	47.42	–12 29 30.9	17.2	9.604	–51.21	–15 58.36	16 7.72	1 6.25	14 18 48.40
	27	14 6 40.83	38.25	12 49 54.2	40.6	9.635	50.72	16 4.07	16 7.98	1 6.36	14 22 44.95
	28	14 10 32.44	29.83	13 9 65.5	52.0	9.667	50.22	16 9.03	16 8.23	1 6.47	14 26 41.51
	29	14 14 24.81	22.18	13 29 64.5	51.1	9.699	49.70	16 13.22	16 8.48	1 6.58	14 30 38.06
	30	14 18 17.96	15.32	13 49 50.9	37.6	9.732	49.16	16 16.62	16 8.73	1 6.69	14 34 34.62
	31	14 22 11.91	9.26	–14 9 24.2	11.0	9.765	–48.61	–16 19.22	16 8.98	1 6.80	14 38 31.17
Nov.	1	14 26 6.68	4.01	14 28 44.0	30.9	9.799	48.04	16 21.02	16 9.23	1 6.91	14 42 27.73
	2	14 29 62.27	59.59	14 47 49.9	36.9	9.833	47.45	16 22.01	16 9.47	1 7.02	14 46 24.29
	3	14 33 58.69	55.99	15 6 41.5	28.7	9.868	46.85	16 22.16	16 9.71	1 7.14	14 50 20.84
	4	14 37 55.94	53.23	15 25 18.5	5.9	9.902	46.22	16 21.47	16 9.95	1 7.25	14 54 17.40
	5	14 41 54.02	51.31	–15 43 40.3	28.0	9.937	–45.58	–16 19.95	16 10.19	1 7.37	14 58 13.95
	6	14 45 52.96	50.24	16 1 46.5	34.5	9.972	44.93	16 17.57	16 10.42	1 7.49	15 2 10.51
	7	14 49 52.75	50.03	16 19 36.7	24.9	10.008	44.25	16 14.35	16 10.65	1 7.61	15 6 7.07
	8	14 53 53.38	50.67	16 36 70.5	58.8	10.043	43.56	16 10.29	16 10.88	1 7.73	15 10 3.62
	9	14 57 54.86	52.16	16 54 27.4	15.9	10.078	42.85	16 5.38	16 11.12	1 7.85	15 14 0.18
	10	15 1 57.19	54.49	–17 11 27.0	15.8	10.114	–42.12	–15 59.62	16 11.35	1 7.97	15 17 56.74
	11	15 5 60.36	57.67	17 27 68.9	58.0	10.149	41.37	15 53.01	16 11.58	1 8.10	15 21 53.29
	12	15 10 4.37	1.69	17 44 32.6	22.0	10.184	40.60	15 45.56	16 11.81	1 8.22	15 25 49.85
	13	15 14 9.22	6.56	18 0 37.8	27.4	10.219	39.82	15 37.27	16 12.04	1 8.34	15 29 46.41
	14	15 18 14.91	12.26	18 16 24.0	13.9	10.254	39.02	15 28.15	16 12.26	1 8.46	15 33 42.96
	15	15 22 21.43	18.80	–18 31 50.8	41.1	10.289	–38.20	–15 18.20	16 12.48	1 8.58	15 37 39.52
	16	15 26 28.77	26.16	–18 46 58.0	48.5	10.323	–37.38	–15 7.42	16 12.69	1 8.70	15 41 36.08

NOTE.—*For* [illegible] interval of semidiameter passing meridian, subtract $0^s.18$ from the sidereal interval.

SOLAR EPHEMERIS, 1912.

FOR WASHINGTON MEAN AND APPARENT NOON.

Date	Apparent Right Ascension.		Apparent Declination.		Hourly Motion.		Equation of Time for Apparent Noon.	Semi-diameter at Apparent Noon.	Sidereal Time of Semid. Passing Merid.	Sidereal Time of Mean Noon.
	Mean Noon.	App. Noon.	Mean Noon.	App. Noon.	Right Ascen.	Decli-nation.				
	h m s	s	° ′ ″	″	s	″	m s	′ ″	m s	h m s
ov. 16	15 26 28.77	26.16	−18 46 58.0	48.5	10.323	−37.38	−15 7.42	16 12.69	1 8.70	15 41 36.08
17	15 30 36.93	34.34	19 1 45.0	35.8	10.357	36.54	14 55.82	16 12.90	1 8.81	15 45 32.64
18	15 34 45.91	43.35	19 16 11.6	2.8	10.391	35.67	14 43.41	16 13.11	1 8.93	15 49 29.19
19	15 38 55.70	53.17	19 30 17.3	8.9	10.425	34.80	14 30.19	16 13.32	1 9.04	15 53 25.75
20	15 43 6.29	3.80	19 43 61.8	53.7	10.458	33.91	14 16.16	16 13.52	1 9.15	15 57 22.31
21	15 47 17.68	15.23	−19 57 24.7	17.0	10.491	−33.00	−14 1.33	16 13.72	1 9.26	16 1 18.86
22	15 51 29.87	27.46	20 10 25.7	18.3	10.524	32.07	13 45.71	16 13.91	1 9.37	16 5 15.42
23	15 55 42.83	40.46	20 22 64.6	57.4	10.557	31.14	13 29.31	16 14.10	1 9.48	16 9 11.98
24	15 59 56.57	54.24	20 35 20.8	14.0	10.589	30.19	13 12.14	16 14.29	1 9.58	16 13 8.54
25	16 4 11.07	8.79	20 47 14.0	7.7	10.621	29.23	12 54.20	16 14.47	1 9.69	16 17 5.10
26	16 8 26.33	24.10	−20 58 44.1	38.2	10.652	−28.25	−12 35.50	16 14.64	1 9.79	16 21 1.65
27	16 12 42.33	40.15	21 9 50.6	45.2	10.682	27.27	12 16.06	16 14.80	1 9.89	16 24 58.21
28	16 16 59.07	56.94	21 20 33.3	28.3	10.712	26.27	11 55.89	16 14.96	1 9.99	16 28 54.77
29	16 21 16.52	14.45	21 30 51.9	47.1	10.742	25.26	11 34.99	16 15.12	1 10.09	16 32 51.33
30	16 25 34.68	32.66	21 40 46.1	41.5	10.771	24.24	11 13.39	16 15.27	1 10.18	16 36 47.89
c. 1	16 29 53.52	51.56	−21 50 15.5	11.2	10.799	−23.20	−10 51.11	16 15.42	1 10.27	16 40 44.45
2	16 34 13.03	11.14	21 59 19.8	15.9	10.826	22.15	10 28.16	16 15.56	1 10.35	16 44 41.00
3	16 38 33.17	31.36	22 7 58.7	55.2	10.852	21.09	10 4.56	16 15.70	1 10.43	16 48 37.56
4	16 42 53.93	52.18	22 16 12.0	8.8	10.877	20.02	9 40.35	16 15.84	1 10.51	16 52 34.12
5	16 47 15.28	13.60	22 23 59.4	56.5	10.901	18.93	9 15.56	16 15.97	1 10.58	16 56 30.68
6	16 51 37.19	35.59	−22 31 20.6	18.0	10.924	−17.83	− 8 50.20	16 16.10	1 10.65	17 0 27.24
7	16 55 59.64	58.11	22 38 15.4	13.1	10.945	16.72	8 24.31	16 16.23	1 10.72	17 4 23.80
8	17 0 22.59	21.13	22 44 43.6	41.6	10.965	15.61	7 57.93	16 16.35	1 10.79	17 8 20.36
9	17 4 45.99	44.62	22 50 44.9	43.1	10.984	14.49	7 31.07	16 16.47	1 10.86	17 12 16.92
10	17 9 9.83	8.55	22 56 19.1	17.5	11.001	13.36	7 3.78	16 16.58	1 10.92	17 16 13.48
11	17 13 34.07	32.87	−23 1 26.0	24.6	11.017	−12.22	− 6 36.09	16 16.69	1 10.97	17 20 10.03
12	17 17 58.68	57.56	23 6 5.5	4.4	11.032	11.07	6 8.03	16 16.80	1 11.02	17 24 6.59
13	17 22 23.62	22.58	23 10 17.4	16.5	11.046	9.92	5 39.64	16 16.91	1 11.06	17 28 3.15
14	17 26 48.86	47.90	23 14 1.6	0.8	11.058	8.76	5 10.95	16 17.01	1 11.10	17 31 59.71
15	17 31 14.38	13.51	23 17 18.0	17.4	11.068	7.59	4 42.00	16 17.11	1 11.14	17 35 56.27
16	17 35 40.12	39.34	−23 20 6.5	6.0	11.077	− 6.43	− 4 12.81	16 17.20	1 11.17	17 39 52.83
17	17 40 6.06	5.37	23 22 26.9	26.5	11.084	5.26	3 43.42	16 17.29	1 11.20	17 43 49.39
18	17 44 32.16	31.56	23 24 19.2	18.9	11.090	4.09	3 13.87	16 17.38	1 11.22	17 47 45.95
19	17 48 58.39	57.88	23 25 43.3	43.1	11.095	2.92	2 44.18	16 17.45	1 11.24	17 51 42.50
20	17 53 24.72	24.30	23 26 39.2	39.1	11.098	1.74	2 14.40	16 17.52	1 11.25	17 55 39.06
21	17 57 51.11	50.79	−23 27 6.9	6.9	11.100	− 0.57	− 1 44.56	16 17.59	1 11.26	17 59 35.62
22	18 2 17.54	17.31	23 27 6.4	6.4	11.101	+ 0.61	1 14.68	16 17.65	1 11.27	18 3 32.18
23	18 6 43.97	43.83	23 26 37.6	37.6	11.101	1.79	0 44.79	16 17.70	1 11.27	18 7 28.74
24	18 11 10.38	10.33	23 25 40.6	40.6	11.099	2.96	− 0 14.93	16 17.75	1 11.26	18 11 25.30
25	18 15 36.75	36.79	23 24 15.4	15.4	11.096	4.13	+ 0 14.89	16 17.79	1 11.25	18 15 21.86
26	18 20 3.03	3.17	−23 22 22.0	22.0	11.093	+ 5.31	+ 0 44.62	16 17.81	1 11.24	18 19 18.42
27	18 24 29.20	29.43	23 20 0.4	0.4	11.088	6.48	1 14.24	16 17.83	1 11.22	18 23 14.98
28	18 28 55.22	55.54	23 17 10.8	10.6	11.081	7.65	1 43.72	16 17.85	1 11.19	18 27 11.54
29	18 33 21.08	21.49	23 13 53.1	52.8	11.073	8.82	2 13.03	16 17.87	1 11.16	18 31 8.10
30	18 37 46.74	47.24	23 10 7.5	7.1	11.065	9.98	2 42.14	16 17.89	1 11.13	18 35 4.66
31	18 42 12.17	12.76	−23 5 54.0	53.5	11.055	+11.14	+ 3 11.01	16 17.89	1 11.09	18 39 1.22
32	18 46 37.33	38.01	−23 1 12.9	12.2	11.044	+12.30	+ 3 39.61	16 17.89	1 11.05	18 42 5

Note.—For mean time interval of semidiameter passing meridian, subtract $0^s.19$ from the sidereal interv

MOON-CULMINATIONS, 1912.

AT TRANSIT OF MOON'S CENTER OVER THE MERIDIAN OF WASHINGTON.

Date.	Culmination.	Mean Time of Transit.	Diff. for 1 Hour of Long.	Right Ascension of Center.	Diff. for 1 Hour of Long.	Geocentric Declination of Center.	Diff. for 1 Hour of Long.	Sid. Time of Semid. Passing Meridian.	Geocentric Semidiameter.	Equatorial Horizontal Parallax.	Bright Limbs.
		h m	m	h m s	s	° ′ ″	″	s	′ ″	′ ″	
Jan. 0	L	21 0.95	2.437	3 40 25.99	156.45	+22 10 0.1	+687.1	73.94	16 24.4	60 7.0	I.
1	U	9 30.97	2.564	4 12 30.25	164.21	24 16 37.5	575.1	75.80	16 31.2	60 31.9	I.
1	L	22 2.48	2.683	4 46 4.39	171.31	25 58 33.8	440.4	77.46	16 37.1	60 53.4	I. *N.*
2	U	10 35.29	2.779	5 20 56.25	177.07	27 11 24.4	285.3	78.78	16 41.8	61 10.7	I. N.
2	L	23 9.03	2.839	5 56 44.88	180.67	+27 51 30.9	+114.1	79.60	16 45.1	61 23.0	I. N.
3	U	11 43.25	2.856	6 33 2.05	181.72	27 56 31.8	− 64.5	79.83	16 47.0	61 29.9	I. N.
4	L	0 17.41	2.829	7 9 15.49	180.07	27 25 48.5	241.8	79.45	16 47.3	61 31.1	II. N.
4	U	12 50.99	2.760	7 44 53.84	175.94	26 20 31.8	408.7	78.50	16 46.1	61 26.4	II. N.
5	L	1 23.55	2.661	8 19 31.01	169.98	+24 43 31.0	−558.0	77.11	16 43.2	61 16.0	II. N.
5	U	13 54.79	2.543	8 52 48.86	162.86	22 38 47.6	685.2	75.44	16 39.1	61 0.7	II. *N.*
6	L	2 24.56	2.417	9 24 38.10	155.31	20 11 2.1	788.3	73.63	16 33.7	60 40.9	II.
6	U	14 52.83	2.294	9 54 57.25	147.92	17 25 5.0	867.4	71.81	16 27.2	60 17.2	II.
7	L	3 19.67	2.181	10 23 50.69	141.09	+14 25 35.2	−924.1	70.11	16 20.0	59 50.7	II.
7	U	15 45.23	2.081	10 51 26.80	135.07	11 16 45.9	961.1	68.59	16 12.3	59 22.3	II.
8	L	4 9.69	1.997	11 17 56.24	130.00	8 2 18.7	980.8	67.26	16 4.2	58 52.6	II.
8	U	16 33.23	1.929	11 43 30.69	125.91	4 45 24.5	986.0	66.18	15 55.9	58 22.4	II.
9	L	4 56.05	1.877	12 8 22.04	122.81	+ 1 28 44.7	−978.7	65.36	15 47.7	57 52.4	II.
9	U	17 18.34	1.841	12 32 41.91	120.66	− 1 45 23.1	960.9	64.78	15 39.8	57 23.3	II.
10	L	5 40.30	1.820	12 56 41.35	119.38	4 55 1.5	934.0	64.44	15 32.2	56 55.3	II.
10	U	18 2.10	1.813	13 20 30.72	118.95	7 58 26.8	898.8	64.33	15 25.0	56 28.9	II.
11	L	6 23.88	1.819	13 44 19.53	119.30	−10 54 5.4	−856.2	64.41	15 18.3	56 4.4	II.
11	U	18 45.79	1.836	14 8 16.43	120.29	13 40 29.9	806.5	64.68	15 12.2	55 42.0	II.
12	L	7 7.97	1.861	14 32 29.01	121.88	16 16 16.1	749.8	65.10	15 6.7	55 21.8	II.
12	U	19 30.52	1.894	14 57 3.64	123.95	18 40 0.2	686.2	65.64	15 1.8	55 3.8	II.
13	L	7 53.51	1.935	15 22 5.33	126.37	−20 50 18.6	−615.6	66.27	14 57.5	54 48.0	II.
13	U	20 17.01	1.980	15 47 37.32	129.00	22 45 47.8	538.2	66.94	14 53.8	54 34.5	II.
14	L	8 41.03	2.024	16 13 40.88	131.63	24 25 5.0	453.8	67.60	14 50.7	54 23.2	II.
14	U	21 5.56	2.065	16 40 15.09	134.06	25 46 51.8	363.0	68.21	14 48.2	54 13.9	II.
15	L	9 30.55	2.099	17 7 16.65	136.12	−26 49 56.1	−266.8	68.71	14 46.2	54 6.6	II.
15	U	21 55.90	2.124	17 34 39.98	137.64	27 33 18.5	166.3	69.07	14 44.7	54 1.2	II. N
16	L	10 21.48	2.137	18 2 17.50	138.47	27 56 15.0	− 62.8	69.25	14 43.7	53 57.5	II. N
16	U	22 47.15	2.139	18 30 0.21	138.51	27 58 22.1	+ 41.7	69.23	14 43.2	53 55.5	II. N
17	L	11 12.75	2.126	18 57 38.41	137.73	−27 39 38.8	+145.3	69.01	14 43.0	53 55.0	
17	U	23 38.11	2.100	19 25 2.73	136.20	27 0 26.9	246.2	68.60	14 43.3	53 56.0	
18	L	12 3.10	2.064	19 52 4.75	134.04	26 1 30.7	342.5	68.02	14 44.0	53 58.4	
19	U	0 27.61	2.020	20 18 37.77	131.39	24 43 53.2	432.8	67.33	14 45.0	54 2.1	
19	L	12 51.57	1.971	20 44 37.20	128.47	−23 8 51.9	+516.2	66.56	14 46.4	54 7.2	
20	U	1 14.93	1.920	21 10 0.80	125.46	21 17 55.6	592.0	65.77	14 48.2	54 13.5	I. N
20	L	13 37.69	1.871	21 34 48.47	122.52	19 12 37.1	659.7	64.99	14 50.2	54 21.1	I.
21	U	1 59.88	1.827	21 59 2.14	119.81	16 54 34.0	719.5	64.27	14 52.6	54 30.1	I.
21	L	14 21.58	1.789	22 22 45.45	117.48	−14 25 22.0	+771.2	63.65	14 55.4	54 40.5	I.
22	U	2 42.85	1.758	22 46 3.54	115.62	11 46 35.7	815.2	63.16	14 58.6	54 52.2	I.
22	L	15 3.80	1.736	23 9 2.60	114.32	8 59 46.8	851.6	62.84	15 2.3	55 5.5	I.
23	U	3 24.56	1.724	23 31 49.87	113.66	6 6 25.1	880.7	62.68	15 6.3	55 20.4	I.
23	L	15 45.26	1.726	23 54 33.36	113.70	− 3 7 59.4	+902.4	62.73	15 10.8	55 36.7	I.

AT TRANSIT OF MOON'S CENTER OVER THE MERIDIAN OF WASHINGTON.

Date.	Culmination.	Mean Time of Transit.	Diff. for 1 Hour of Long.	Right Ascension of Center.	Diff. for 1 Hour of Long.	Geocentric Declination of Center.	Diff. for 1 Hour of Long.	Sid. Time of Semid. Passing Meridian.	Geocentric Semidiameter.	Equatorial Horizontal Parallax.	Bright Limbs.
		h m	m	h m s	s	° ′ ″	″	s	′ ″	′ ″	
n. 23	L	15 45.26	1.726	23 54 33.36	113.70	− 3 7 59.4	+ 902.4	62.73	15 10.8	55 36.7	I. S.
24	U	4 6.04	1.739	0 17 21.79	114.51	− 0 5 59.0	916.5	62.99	15 15.7	55 54.8	I. S.
24	L	16 27.06	1.766	0 40 24.59	116.10	+ 2 58 3.4	922.6	63.47	15 21.1	56 14.5	I. S.
25	U	4 48.48	1.806	1 3 51.68	118.56	6 2 28.4	920.2	64.18	15 26.8	56 35.7	I. S.
25	L	17 10.48	1.861	1 27 53.57	121.91	+ 9 5 27.6	+ 908.1	65.12	15 33.0	56 58.4	I. S.
26	U	5 33.24	1.932	1 52 41.15	126.17	12 4 57.9	885.1	66.31	15 39.6	57 22.5	I. S.
26	L	17 56.94	2.019	2 18 25.43	131.34	14 58 38.6	849.5	67.70	15 46.5	57 47.7	I. S.
27	U	6 21.76	2.120	2 45 17.01	137.38	17 43 47.3	799.4	69.29	15 53.6	58 13.8	I. S.
27	L	18 47.86	2.233	3 13 25.69	144.16	+20 17 16.3	+ 732.5	71.02	16 0.8	58 40.3	I. S.
28	U	7 15.36	2.351	3 42 58.60	151.40	22 35 34.2	647.0	72.84	16 8.0	59 6.5	I. S.
28	L	19 44.33	2.474	4 13 59.52	158.74	24 34 47.0	541.7	74.62	16 14.9	59 32.1	I. S.
29	U	8 14.72	2.590	4 46 26.83	165.67	26 10 50.2	415.8	76.27	16 21.5	59 56.5	I. S.
29	L	20 46.42	2.687	5 20 11.88	171.59	+27 19 44.0	+ 270.4	77.65	16 27.6	60 18.8	I. *N.* S.
30	U	9 19.14	2.760	5 54 58.65	175.84	27 57 58.3	+ 109.8	78.61	16 32.9	60 38.2	I. N.
30	L	21 52.49	2.793	6 30 23.30	177.90	28 2 59.9	− 60.2	79.05	16 37.2	60 54.0	I. N.
31	U	10 26.01	2.787	7 5 58.46	177.54	27 33 36.2	232.7	78.94	16 40.4	61 5.6	I. N.
31	L	22 59.23	2.743	7 41 15.10	174.86	+26 30 10.8	− 399.5	78.29	16 42.3	61 12.4	I. N.
b. 1	U	11 31.71	2.666	8 15 47.48	170.26	24 54 41.1	552.6	77.19	16 42.7	61 14.0	I. N.
2	L	0 3.12	2.569	8 49 16.04	164.33	22 50 23.2	686.8	75.77	16 41.7	61 10.3	I. N.
2	U	12 33.28	2.459	9 21 28.82	157.74	20 21 27.2	798.6	74.16	16 39.2	61 1.3	II. N.
3	L	1 2.11	2.346	9 52 21.23	151.02	+17 32 31.6	− 886.7	72.52	16 35.4	60 47.3	II. N. *S.*
3	U	13 29.62	2.240	10 21 54.81	144.65	14 28 18.8	951.7	70.93	16 30.4	60 28.8	II. S.
4	L	1 55.92	2.146	10 50 15.56	138.93	11 13 18.5	994.8	69.48	16 24.3	60 6.5	II. S.
4	U	14 21.16	2.064	11 17 32.30	134.00	7 51 37.9	1018.4	68.22	16 17.4	59 41.1	II. S.
5	L	2 45.51	1.997	11 43 55.38	129.98	+ 4 26 57.0	−1025.1	67.19	16 9.8	59 13.3	II. S.
5	U	15 9.14	1.944	12 9 35.77	126.90	+ 1 2 27.4	1017.2	66.39	16 1.8	58 44.0	II. S.
6	L	3 32.25	1.909	12 34 44.44	124.69	− 2 19 5.6	996.3	65.84	15 53.6	58 14.0	II. S.
6	U	15 55.01	1.886	12 59 31.95	123.35	5 35 19.8	964.3	65.50	15 45.4	57 43.9	II. S.
7	L	4 17.59	1.877	13 24 8.30	122.82	− 8 44 11.9	− 922.8	65.39	15 37.4	57 14.3	II. S.
7	U	16 40.13	1.880	13 48 42.61	123.04	11 43 53.9	872.9	65.46	15 29.6	56 45.8	II. S.
8	L	5 2.77	1.894	14 13 23.14	123.89	14 32 48.5	815.1	65.71	15 22.3	56 18.9	II. S.
8	U	17 25.63	1.917	14 38 16.99	125.25	17 9 26.9	749.8	66.10	15 15.5	55 53.9	II. S.
9	L	5 48.81	1.947	15 3 30.08	127.02	−19 32 25.4	− 678.1	66.59	15 9.3	55 31.2	II. S.
9	U	18 12.39	1.981	15 29 6.73	129.12	21 40 23.6	600.0	67.15	15 3.7	55 10.9	II. S.
10	L	6 36.40	2.020	15 55 9.56	131.37	23 32 5.4	515.7	67.74	14 58.8	54 53.1	II. S.
10	U	19 0.85	2.056	16 21 39.21	133.58	25 6 19.2	425.6	68.32	14 54.7	54 37.9	II. S.
11	L	7 25.73	2.089	16 48 34.26	135.56	−26 21 58.8	− 330.2	68.81	14 51.3	54 25.4	II. S.
11	U	19 50.97	2.116	17 15 51.01	137.15	27 18 7.4	230.6	69.21	14 48.6	54 15.4	II. S.
12	L	8 16.48	2.133	17 43 23.86	138.21	27 53 59.9	127.8	69.45	14 46.6	54 8.0	II. N.
12	U	20 42.13	2.140	18 11 5.48	138.61	28 9 7.0	− 23.2	69.52	14 45.3	54 3.1	II. N.
13	L	9 7.79	2.134	18 38 47.50	138.27	−28 3 17.7	+ 81.5	69.39	14 44.5	54 0.5	II. N.
13	U	21 33.31	2.117	19 6 21.25	137.23	27 36 40.5	184.5	69.08	14 44.4	54 0.0	II. N.
14	L	9 58.56	2.089	19 33 38.45	135.53	26 49 44.6	284.2	68.59	14 44.8	54 1.6	II. N.
14	U	22 23.41	2.051	20 0 31.93	133.31	25 43 17.8	379.4	67.97	14 45.7	54 5.0	II. N.
15	L	10 47.78	2.009	20 26 56.22	130.69	−24 18 24.0	+ 468.6	67.25	14 47.1	54 10.0	II. N.

AT TRANSIT OF MOON'S CENTER OVER THE MERIDIAN OF WASHINGTON.

Date.	Culmination.	Mean Time of Transit.	Diff. for 1 Hour of Long.	Right Ascension of Center.	Diff. for 1 Hour of Long.	Geocentric Declination of Center.	Diff. for 1 Hour of Long.	Sid. Time of Semid. Passing Meridian.	Geocentric Semidiameter.	Equatorial Horizontal Parallax.	Bright Limbs.
		h m	m	h m s	s	° ′ ″	″	s	′ ″	′ ″	
Feb. 15	L	10 47.78	2.009	20 26 56.22	130.69	−24 18 24.0	+ 468.6	67.25	14 47.1	54 10.0	II. N.
15	U	23 11.60	1.961	20 52 47.77	127.88	22 36 20.6	550.8	66.47	14 48.9	54 16.6	II. N.
16	L	11 34.85	1.913	21 18 5.11	125.01	20 38 34.0	625.6	65.69	14 51.1	54 24.5	
16	U	23 57.55	1.869	21 42 48.74	122.27	18 26 37.4	692.4	64.93	14 53.6	54 33.6	
17	L	12 19.72	1.827	22 7 0.94	119.80	−16 2 7.8	+ 751.1	64.24	14 56.3	54 43.7	
18	U	0 41.43	1.791	22 30 45.48	117.69	13 26 43.3	801.6	63.66	14 59.3	54 54.8	
18	L	13 2.76	1.764	22 54 7.38	116.05	10 42 3.1	843.7	63.21	15 2.6	55 6.8	
19	U	1 23.82	1.746	23 17 12.74	114.95	7 49 46.0	877.6	62.92	15 6.1	55 19.5	I. S.
19	L	13 44.72	1.738	23 40 8.43	114.44	− 4 51 31.1	+ 903.4	62.81	15 9.8	55 33.0	I. S.
20	U	2 5.59	1.741	0 3 2.07	114.60	− 1 48 59.0	920.6	62.88	15 13.7	55 47.2	I. S.
20	L	14 26.56	1.757	0 26 1.90	115.48	+ 1 16 8.3	929.0	63.16	15 17.7	56 2.1	I. S.
21	U	2 47.77	1.786	0 49 16.62	117.09	4 22 5.0	928.7	63.64	15 21.9	56 17.7	I. S.
21	L	15 9.39	1.826	1 12 55.44	119.51	+ 7 26 59.3	+ 918.7	64.35	15 26.4	56 34.0	I. S.
22	U	3 31.57	1.878	1 37 7.89	122.71	10 28 51.2	898.2	65.27	15 31.0	56 51.0	I. S.
22	L	15 54.46	1.943	2 2 3.64	126.71	13 25 29.9	866.3	66.40	15 35.8	57 8.7	I. S.
23	U	4 18.23	2.021	2 27 52.19	131.50	16 14 30.9	821.7	67.71	15 40.8	57 26.9	I. S.
23	L	16 43.03	2.113	2 54 42.55	137.00	+18 53 14.4	+ 763.0	69.19	15 45.9	57 45.6	I. S.
24	U	5 8.99	2.213	3 22 42.26	143.03	21 18 44.2	689.2	70.77	15 51.1	58 4.7	I. S.
24	L	17 36.18	2.319	3 51 56.57	149.39	23 27 47.6	598.6	72.39	15 56.4	58 24.1	I. S.
25	U	6 4.64	2.424	4 22 27.34	155.70	25 17 1.6	490.8	73.97	16 1.7	58 43.5	I. S.
25	L	18 34.33	2.521	4 54 11.66	161.56	+26 43 0.2	+ 366.1	75.40	16 6.9	59 2.6	I. S.
26	U	7 5.10	2.603	5 27 0.93	166.44	27 42 28.1	226.2	76.56	16 11.8	59 20.8	I. N. S.
26	L	19 36.70	2.660	6 0 40.51	169.88	28 12 39.0	+ 74.1	77.36	16 16.5	59 37.9	I. N. S.
27	U	8 8.81	2.686	6 34 50.63	171.48	28 11 35.4	− 85.4	77.72	16 20.7	59 53.3	I. N.
27	L	20 41.04	2.680	7 9 8.25	171.12	+27 38 23.8	− 246.3	77.59	16 24.3	60 6.5	I. N.
28	U	9 13.01	2.643	7 43 9.97	168.87	26 33 25.1	402.2	77.02	16 27.1	60 17.0	I. N.
28	L	21 44.37	2.579	8 16 34.94	165.05	24 58 13.7	547.6	76.07	16 29.1	60 24.3	I. N.
29	U	10 14.85	2.499	8 49 7.12	160.16	22 55 28.1	677.2	74.86	16 30.1	60 28.0	I. N.
29	L	22 44.29	2.407	9 20 36.46	154.67	+20 28 33.4	− 788.5	73.48	16 30.0	60 27.8	I. N.
Mar. 1	U	11 12.61	2.313	9 50 58.79	149.06	17 41 25.0	879.3	72.06	16 28.9	60 23.5	I. N.
1	L	23 39.84	2.224	10 20 15.02	143.70	14 38 10.5	949.5	70.70	16 26.7	60 15.1	I. N.
2	U	12 6.04	2.144	10 48 29.87	138.87	11 22 57.1	999.1	69.45	16 23.3	60 2.8	I. *II.* N.
3	L	0 31.35	2.076	11 15 50.76	134.74	+ 7 59 41.4	−1030.1	68.37	16 18.9	59 46.8	II. N. *S.*
3	U	12 55.93	2.020	11 42 26.59	131.38	4 32 5.3	1043.1	67.49	16 13.6	59 27.5	II. *N.* S.
4	L	1 19.89	1.977	12 8 27.04	128.83	+ 1 3 31.2	1039.8	66.83	16 7.6	59 5.4	II. S.
4	U	13 43.42	1.949	12 34 1.89	127.11	− 2 22 57.3	1022.2	66.39	16 1.0	58 41.2	II. S.
5	L	2 6.70	1.933	12 59 20.76	126.16	− 5 44 35.8	− 991.9	66.16	15 54.0	58 15.4	II. S.
5	U	14 29.87	1.930	13 24 32.71	125.95	8 58 57.3	949.8	66.13	15 46.7	57 48.6	II. S.
6	L	2 53.05	1.936	13 49 46.03	126.37	12 3 49.7	897.3	66.29	15 39.4	57 21.6	II. S.
6	U	15 16.39	1.953	14 15 8.03	127.37	14 57 14.6	835.3	66.59	15 32.1	56 54.9	II. S.
7	L	3 39.96	1.977	14 40 44.93	128.84	−17 37 24.7	− 764.9	67.02	15 25.0	56 29.0	II. S.
7	U	16 3.87	2.007	15 6 41.50	130.63	20 2 43.0	686.8	67.53	15 18.3	56 4.5	II. S.
8	L	4 28.16	2.040	15 33 0.89	132.62	22 11 40.8	601.8	68.09	15 12.1	55 41.7	II. S.
8	U	16 52.84	2.074	15 59 44.43	134.63	24 2 58.0	510.4	68.66	15 6.4	55 20.9	II. S.
9	L	5 17.92	2.104	16 26 51.40	136.49	−25 35 24.6	− 413.4	69.15	15 1.4	55 2.4	II. S.

AT TRANSIT OF MOON'S CENTER OVER THE MERIDIAN OF WASHINGTON.

Date.	Culmination.	Mean Time of Transit.	Diff. for 1 Hour of Long.	Right Ascension of Center.	Diff. for 1 Hour of Long.	Geocentric Declination of Center.	Diff. for 1 Hour of Long.	Sid. Time of Semid. Passing Meridian.	Geocentric Semidiameter.	Equatorial Horizontal Parallax.	Bright Limbs.
		h m	m	h m s	s	° ′ ″	″	s	′ ″	′ ″	
Mar. 9	L	5 17.92	2.104	16 26 51.40	136.49	−25 35 24.6	− 413.4	69.15	15 1.4	55 2.4	II. S.
9	U	17 43.34	2.130	16 54 19.00	138.03	26 48 1.5	312.1	69.57	14 57.1	54 46.5	II. S.
10	L	6 9.02	2.149	17 22 2.47	139.11	27 40 2.8	207.6	69.85	14 53.5	54 33.3	II. S.
10	U	18 34.86	2.156	17 49 55.36	139.59	28 10 57.9	− 101.3	69.98	14 50.7	54 22.9	II. S.
11	L	7 0.73	2.153	18 17 50.02	139.40	−28 20 33.7	+ 5.3	69.92	14 48.6	54 15.3	II. N.
11	U	19 26.49	2.139	18 45 38.30	138.53	28 8 55.3	110.7	69.66	14 47.2	54 10.4	II. N.
12	L	7 52.01	2.113	19 13 12.22	137.02	27 36 25.9	213.5	69.24	14 46.6	54 8.2	II. N.
12	U	20 17.18	2.080	19 40 24.63	134.97	26 43 46.4	312.2	68.68	14 46.8	54 8.7	II. N.
13	L	8 41.90	2.039	20 7 9.88	132.51	−25 31 51.8	+ 405.8	67.99	14 47.6	54 11.6	II. N.
13	U	21 6.10	1.994	20 33 24.05	129.82	24 1 49.7	493.3	67.23	14 49.0	54 16.9	II. N.
14	L	9 29.75	1.947	20 59 5.18	127.03	22 14 56.8	574.3	66.44	14 51.0	54 24.3	II. N.
14	U	21 52.84	1.903	21 24 13.17	124.33	20 12 36.4	647.9	65.67	14 53.6	54 33.7	II. N.
15	L	10 15.42	1.860	21 48 49.70	121.83	−17 56 16.3	+ 714.2	64.95	14 56.6	54 44.7	II. N.
15	U	22 37.53	1.824	22 12 57.97	119.64	15 27 27.3	772.7	64.32	15 0.0	54 57.2	II. N.
16	L	10 59.24	1.794	22 36 42.46	117.86	12 47 42.8	823.3	63.80	15 3.7	55 10.8	II. N.
16	U	23 20.65	1.773	23 0 8.69	116.59	9 58 38.3	865.9	63.43	15 7.6	55 25.3	
17	L	11 41.86	1.763	23 23 23.11	115.91	− 7 1 51.7	+ 900.4	63.22	15 11.8	55 40.6	
18	U	0 2.99	1.762	23 46 32.77	115.82	3 59 4.7	926.0	63.19	15 16.1	55 56.4	
18	L	12 24.17	1.770	0 9 45.37	116.39	− 0 52 3.6	942.6	63.36	15 20.5	56 12.4	
19	U	0 45.53	1.791	0 33 9.08	117.68	+ 2 17 19.6	949.6	63.72	15 24.9	56 28.4	
19	L	13 7.23	1.824	0 56 52.47	119.69	+ 5 27 5.6	+ 946.2	64.30	15 29.2	56 44.3	
20	U	1 29.39	1.871	1 21 4.40	122.44	8 35 5.9	931.8	65.07	15 33.4	57 0.0	I. S.
20	L	13 52.18	1.929	1 45 53.82	125.92	11 39 1.7	905.4	66.05	15 37.6	57 15.3	I. S.
21	U	2 15.74	1.999	2 11 29.48	130.13	14 36 22.5	865.8	67.22	15 41.7	57 30.1	I. S.
21	L	14 40.21	2.080	2 37 59.66	134.99	+17 24 24.9	+ 812.1	68.54	15 45.6	57 44.3	I. S.
22	U	3 5.70	2.170	3 5 31.38	140.37	20 0 13.1	743.4	69.98	15 49.3	57 58.0	I. S.
22	L	15 32.29	2.263	3 34 9.76	146.06	22 20 40.5	658.5	71.47	15 52.9	58 11.2	I. S.
23	U	4 0.02	2.359	4 3 56.93	151.78	24 22 33.0	557.6	72.94	15 56.3	58 23.7	I. S.
23	L	16 28.88	2.449	4 34 51.15	157.16	+26 2 38.1	+ 440.8	74.30	15 59.5	58 35.6	I. S.
24	U	4 58.74	2.524	5 6 45.83	161.78	27 17 53.3	309.6	75.46	16 2.6	58 46.8	I. S.
24	L	17 29.41	2.581	5 39 29.23	165.21	28 5 41.5	166.7	76.31	16 5.4	58 57.2	I. S.
25	U	6 0.61	2.614	6 12 44.88	167.12	28 24 5.1	+ 16.3	76.77	16 8.0	59 6.7	I. N.
25	L	18 32.03	2.617	6 46 13.09	167.29	+28 11 59.7	− 137.2	76.81	16 10.3	59 15.1	I. N.
26	U	7 3.30	2.591	7 19 33.06	165.75	27 29 21.2	288.4	76.44	16 12.3	59 22.3	I. N.
26	L	19 34.12	2.540	7 52 25.44	162.74	26 17 7.9	432.1	75.69	16 13.9	59 28.1	I. N.
27	U	8 4.22	2.473	8 24 34.40	158.60	24 37 13.8	564.5	74.65	16 15.0	59 32.2	I. N.
27	L	20 33.41	2.391	8 55 49.05	153.76	+22 32 16.1	− 682.4	73.43	16 15.6	59 34.6	I. N.
28	U	9 1.60	2.306	9 26 3.65	148.66	20 5 22.7	783.6	72.11	16 15.6	59 34.8	I. N.
28	L	21 28.78	2.223	9 55 17.32	143.65	17 19 58.7	867.4	70.82	16 15.1	59 32.7	I. N.
29	U	9 55.00	2.147	10 23 33.03	139.04	14 19 35.2	933.6	69.59	16 13.8	59 28.0	I. N.
29	L	22 20.35	2.080	10 50 56.66	135.00	+11 7 42.4	− 982.4	68.50	16 11.8	59 20.8	I. N.
30	U	10 44.97	2.024	11 17 35.92	131.66	7 47 43.9	1014.8	67.60	16 9.2	59 11.2	I. N.
30	L	23 9.00	1.981	11 43 39.66	129.09	4 22 55.0	1030.9	66.90	16 5.9	58 59.0	I. N.
31	U	11 32.59	1.951	12 9 17.24	127.30	+ 0 56 20.1	1032.4	66.40	16 1.9	58 44.3	I. N.
31	L	23 55.90	1.934	12 34 37.98	126.28	− 2 29 6.3	−1019.7	66.12	15 57.3	58 27.6	I. *II.* N. *S.*

AT TRANSIT OF MOON'S CENTER OVER THE MERIDIAN OF WASHINGTON.

Date.	Culmination.	Mean Time of Transit.	Diff. for 1 Hour of Long.	Right Ascension of Center.	Diff. for 1 Hour of Long.	Geocentric Declination of Center.	Diff. for 1 Hour of Long.	Sid. Time of Semid. Passing Meridian.	Geocentric Semidiameter.	Equatorial Horizontal Parallax.	Bright Limbs.
		h m	m	h m s	s	° ′ ″	″	s	′ ″	′ ″	
Mar. 31	L	23 55.90	1.934	12 34 37.98	126.28	− 2 29 6.3	−1019.7	66.12	15 57.3	58 27.6	I. *II.* N. *S.*
Apr. 1	U	12 19.08	1.930	12 59 50.96	125.99	5 50 40.6	993.8	66.04	15 52.2	58 8.9	II. N. S.
2	L	0 42.27	1.937	13 25 4.68	126.40	9 5 49.1	955.6	66.16	15 46.7	57 48.5	II. S.
2	U	13 5.61	1.953	13 50 26.87	127.40	12 12 8.1	905.7	66.45	15 40.9	57 27.3	II. S.
3	L	1 29.20	1.979	14 16 4.21	128.91	−15 7 22.6	− 844.9	66.88	15 34.9	57 5.4	II. S.
3	U	13 53.12	2.011	14 42 2.08	130.80	17 49 27.1	774.2	67.41	15 28.9	56 43.2	II. S.
4	L	2 17.46	2.046	15 8 24.35	132.94	20 16 26.3	694.2	68.01	15 22.9	56 21.2	II. S.
4	U	14 42.23	2.083	15 35 13.00	135.16	22 26 34.5	605.9	68.64	15 17.1	56 0.0	II. S.
5	L	3 7.43	2.119	16 2 27.86	137.29	−24 18 18.6	− 510.4	69.23	15 11.6	55 39.9	II. S.
5	U	15 33.04	2.149	16 30 6.66	139.12	25 50 19.2	408.9	69.74	15 6.5	55 21.2	II. S.
6	L	3 58.97	2.171	16 58 4.83	140.49	27 1 33.4	303.0	70.13	15 1.9	55 4.2	II. S.
6	U	16 25.11	2.184	17 26 15.86	141.25	27 51 17.6	194.3	70.35	14 57.8	54 49.3	II. S.
7	L	4 51.33	2.184	17 54 31.78	141.30	−28 19 8.0	− 84.4	70.39	14 54.4	54 36.8	II. *N.* S.
7	U	17 17.49	2.173	18 22 43.77	140.60	28 25 3.3	+ 24.7	70.23	14 51.7	54 26.9	II. N.
8	L	5 43.43	2.150	18 50 43.03	139.18	28 9 22.6	131.2	69.88	14 49.8	54 19.7	II. N.
8	U	18 9.03	2.116	19 18 21.44	137.14	27 32 44.2	233.9	69.36	14 48.6	54 15.3	II. N.
9	L	6 34.17	2.074	19 45 32.39	134.62	−26 36 3.0	+ 331.6	68.69	14 48.1	54 13.7	II. N.
9	U	18 58.77	2.026	20 12 11.10	131.79	25 20 25.6	423.3	67.93	14 48.4	54 14.8	II. N.
10	L	7 22.81	1.977	20 38 14.89	128.83	23 47 7.4	508.5	67.12	14 49.5	54 18.7	II. N.
10	U	19 46.24	1.929	21 3 43.16	125.90	21 57 29.1	586.8	66.31	14 51.3	54 25.3	II. N.
11	L	8 9.11	1.883	21 28 37.21	123.15	−19 52 53.6	+ 657.9	65.53	14 53.8	54 34.4	II. N.
11	U	20 31.46	1.843	21 53 0.04	120.72	17 34 44.9	722.2	64.82	14 56.9	54 45.9	II. N.
12	L	8 53.36	1.809	22 16 56.05	118.69	15 4 27.6	779.5	64.23	15 0.6	54 59.6	II. N.
12	U	21 14.91	1.784	22 40 30.80	117.18	12 23 26.4	829.8	63.78	15 4.9	55 15.2	II. N.
13	L	9 36.21	1.767	23 3 50.75	116.25	− 9 33 7.6	+ 872.7	63.48	15 9.6	55 32.4	II. N.
13	U	21 57.39	1.763	23 27 3.11	115.93	6 35 0.7	907.8	63.35	15 14.6	55 50.8	II. N.
14	L	10 18.57	1.769	23 50 15.69	116.29	3 30 40.0	934.6	63.43	15 19.9	56 10.3	II. N.
14	U	22 39.89	1.786	0 13 36.88	117.37	− 0 21 46.8	952.7	63.71	15 25.4	56 30.3	II. N.
15	L	11 1.50	1.817	0 37 15.42	119.19	+ 2 49 47.5	+ 961.2	64.19	15 30.9	56 50.5	
15	U	23 23.55	1.860	1 1 20.45	121.79	6 1 59.8	958.9	64.90	15 36.4	57 10.6	
16	L	11 46.20	1.916	1 26 1.27	125.15	9 12 33.0	944.4	65.81	15 41.7	57 30.1	
17	U	0 9.60	1.984	1 51 27.14	129.25	12 18 53.9	916.6	66.92	15 46.7	57 48.7	
17	L	12 33.89	2.066	2 17 46.91	134.07	+15 18 12.4	+ 873.8	68.21	15 51.4	58 6.0	
18	U	0 59.21	2.156	2 45 8.40	139.52	18 7 21.0	814.8	69.64	15 55.8	58 21.9	
18	L	13 25.65	2.253	3 13 37.71	145.39	20 42 57.9	738.4	71.16	15 59.6	58 36.0	I. S.
19	U	1 53.28	2.352	3 43 18.10	151.34	23 1 30.2	643.9	72.69	16 3.0	58 48.3	I. S.
19	L	14 22.08	2.446	4 14 8.94	157.05	+24 59 23.0	+ 531.8	74.14	16 5.8	58 58.6	I. S.
20	U	2 51.95	2.529	4 46 4.58	162.06	26 33 10.8	403.4	75.39	16 8.0	59 6.9	I. S.
20	L	15 22.72	2.594	5 18 53.92	165.92	27 39 53.0	261.5	76.36	16 9.8	59 13.2	I. S.
21	U	3 54.09	2.631	5 52 20.46	168.20	28 17 10.2	+ 110.1	76.94	16 10.9	59 17.5	I. S.
21	L	16 25.76	2.640	6 26 3.71	168.68	+28 23 39.8	− 45.5	77.08	16 11.6	59 20.0	I. N.
22	U	4 57.34	2.617	6 59 41.42	167.32	27 59 4.9	199.6	76.78	16 11.9	59 20.9	I. N.
22	L	17 28.46	2.566	7 32 52.35	164.27	27 4 15.6	347.0	76.07	16 11.7	59 20.2	I. N.
23	U	5 58.85	2.494	8 5 18.70	159.95	25 41 1.4	483.1	75.03	16 11.1	59 18.0	I. N.
23	*L*	*18 28.28*	2.409	8 36 47.83	154.80	+23 51 57.5	− 604.9	73.76	16 10.1	59 14.5	I. N.

AT TRANSIT OF MOON'S CENTER OVER THE MERIDIAN OF WASHINGTON.

Date.	Culmination.	Mean Time of Transit.	Diff. for 1 Hour of Long.	Right Ascension of Center.	Diff. for 1 Hour of Long.	Geocentric Declination of Center.	Diff. for 1 Hour of Long.	Sid. Time of Semid. Passing Meridian.	Geocentric Semidiameter.	Equatorial Horizontal Parallax.	Bright Limbs.
		h m	m	h m s	s	° ′ ″	″	s	′ ″	′ ″	
pr. 23	L	18 28.28	2.409	8 36 47.83	154.80	+23 51 57.5	− 604.9	73.76	16 10.1	59 14.5	I. N.
24	U	6 56.64	2.317	9 7 12.67	149.31	21 40 9.1	710.3	72.38	16 8.8	59 9.8	I. N.
24	L	19 23.91	2.227	9 36 31.49	143.87	19 8 54.9	799.1	70.98	16 7.2	59 3.9	I. N.
25	U	7 50.13	2.143	10 4 46.80	138.79	16 21 37.2	871.1	69.65	16 5.3	58 56.9	I. N.
25	L	20 15.38	2.069	10 32 4.74	134.30	+13 21 33.1	− 926.9	68.46	16 3.1	58 48.7	I. N.
26	U	8 39.81	2.006	10 58 32.90	130.53	10 11 50.3	967.6	67.43	16 0.6	58 39.4	I. N.
26	L	21 3.57	1.956	11 24 20.58	127.56	6 55 26.4	993.9	66.60	15 57.7	58 28.9	I. N.
27	U	9 26.82	1.920	11 49 37.59	125.41	3 35 8.1	1006.8	65.99	15 54.6	58 17.4	I. N.
27	L	21 49.72	1.899	12 14 33.83	124.09	+ 0 13 34.1	−1006.7	65.59	15 51.1	58 4.8	I. N.
28	U	10 12.44	1.890	12 39 19.04	123.57	− 3 6 45.2	994.4	65.42	15 47.4	57 51.1	I. N.
28	L	22 35.13	1.894	13 4 2.49	123.79	6 23 25.0	970.2	65.47	15 43.4	57 36.3	I. N.
29	U	10 57.94	1.909	13 28 52.83	124.71	9 34 4.4	934.5	65.69	15 39.1	57 20.7	I. N.
29	L	23 20.99	1.934	13 53 57.76	126.22	−12 36 27.2	− 887.5	66.09	15 34.6	57 4.3	I. N. *S.*
30	U	11 44.39	1.967	14 19 24.00	128.22	15 28 20.5	829.6	66.62	15 30.0	56 47.3	I. *N.* S.
ay 1	L	0 8.23	2.007	14 45 16.74	130.61	18 7 35.0	761.1	67.26	15 25.3	56 29.9	II. S.
1	U	12 32.57	2.050	15 11 39.51	133.21	20 32 7.7	682.6	67.96	15 20.5	56 12.5	II. S.
2	L	0 57.44	2.093	15 38 33.76	135.83	−22 40 2.6	− 595.0	68.66	15 15.8	55 55.3	II. S.
2	U	13 22.81	2.134	16 5 58.55	138.27	24 29 34.8	499.1	69.32	15 11.2	55 38.4	II. S.
3	L	1 48.63	2.167	16 33 50.44	140.31	25 59 14.6	396.5	69.87	15 6.8	55 22.2	II. S.
3	U	14 14.81	2.193	17 2 3.54	141.76	27 7 50.2	288.8	70.29	15 2.7	55 7.1	II. S.
4	L	2 41.20	2.204	17 30 29.82	142.48	−27 54 32.9	− 178.0	70.51	14 59.0	54 53.4	II. S.
4	U	15 7.65	2.203	17 58 59.69	142.35	28 18 58.6	− 66.3	70.50	14 55.6	54 41.2	II. S.
5	L	3 34.00	2.186	18 27 22.88	141.37	28 21 9.6	+ 44.1	70.29	14 52.8	54 30.9	II. *N.* S.
5	U	16 0.07	2.156	18 55 29.51	139.60	28 1 32.8	151.4	69.87	14 50.6	54 22.7	II. N. *S.*
6	L	4 25.71	2.116	19 23 10.74	137.17	−27 20 57.7	+ 253.8	69.27	14 49.0	54 16.8	II. N.
6	U	16 50.82	2.067	19 50 19.70	134.25	26 20 30.0	350.0	68.53	14 48.1	54 13.4	II. N.
7	L	5 15.32	2.014	20 16 51.72	131.05	25 1 28.7	439.2	67.70	14 47.8	54 12.6	II. N.
7	U	17 39.16	1.959	20 42 44.61	127.75	23 25 18.9	521.2	66.84	14 48.4	54 14.5	II. N.
8	L	6 2.36	1.907	21 7 58.54	124.58	−21 33 28.8	+ 595.9	65.97	14 49.6	54 19.2	II. N.
8	U	18 24.95	1.859	21 32 35.61	121.65	19 27 26.2	663.2	65.17	14 51.6	54 26.5	II. N.
9	L	6 46.98	1.816	21 56 39.74	119.11	17 8 36.6	723.5	64.46	14 54.4	54 36.5	II. N.
9	U	19 8.56	1.782	22 20 16.27	117.06	14 38 21.9	777.4	63.88	14 57.9	54 49.2	II. N.
10	L	7 29.79	1.757	22 43 31.56	115.58	−11 58 2.2	+ 824.6	63.44	15 2.0	55 4.4	II. N.
10	U	19 50.78	1.743	23 6 32.92	114.75	9 8 56.1	865.2	63.19	15 6.8	55 22.1	II. N.
11	L	8 11.68	1.741	23 29 28.37	114.62	6 12 23.2	899.0	63.11	15 12.1	55 41.7	II. N.
11	U	20 32.62	1.750	23 52 26.53	115.21	3 9 46.5	925.7	63.25	15 18.0	56 3.2	II. N.
12	L	8 53.76	1.773	0 15 36.54	116.59	− 0 2 36.2	+ 944.4	63.62	15 24.3	56 26.3	II. N.
12	U	21 15.25	1.810	0 39 8.06	118.80	+ 3 7 27.7	954.5	64.20	15 30.8	56 50.3	II. N.
13	L	9 37.27	1.861	1 3 11.13	121.86	6 18 31.3	954.3	65.01	15 37.5	57 14.9	II. N.
13	U	21 59.99	1.926	1 27 56.04	125.77	9 28 23.7	942.3	66.06	15 44.3	57 39.7	II. N.
14	L	10 23.57	2.006	1 53 33.12	130.54	+12 34 32.6	+ 916.7	67.31	15 50.9	58 4.1	II. N.
14	U	22 48.18	2.099	2 20 12.20	136.09	15 34 2.6	875.5	68.76	15 57.3	58 27.5	II. N.
15	L	11 13.97	2.201	2 48 2.14	142.31	18 23 34.1	816.6	70.35	16 3.3	58 49.4	
15	U	23 41.05	2.311	3 17 9.53	148.96	20 59 26.4	738.5	72.03	16 8.7	59 9.2	
16	L	12 9.47	2.424	3 47 37.69	155.73	+23 17 39.5	+ 640.2	73.71	16 13.4	59 26.6	

MOON-CULMINATIONS, 1912.

AT TRANSIT OF MOON'S CENTER OVER THE MERIDIAN OF WASHINGTON.

Date.	Culmination.	Mean Time of Transit.	Diff. for 1 Hour of Long.	Right Ascension of Center.	Diff. for 1 Hour of Long.	Geocentric Declination of Center.	Diff. for 1 Hour of Long.	Sid. Time of Semid. Passing Meridian.	Geocentric Semidiameter.	Equatorial Horizontal Parallax.	Bright Limbs.
		h m	m	h m s	s	° ′ ″	″	s	′ ″	′ ″	
May 16	L	12 9.47	2.424	3 47 37.69	155.73	+23 17 39.5	+640.2	73.71	16 13.4	59 26.6	
17	U	0 39.20	2.530	4 19 25.03	162.08	25 14 8.8	521.4	75.27	16 17.3	59 40.9	
17	L	13 10.13	2.621	4 52 23.69	167.52	26 44 59.6	384.1	76.60	16 20.4	59 52.1	I. S.
18	U	1 42.00	2.686	5 26 19.43	171.46	27 46 48.8	231.9	77.56	16 22.5	59 59.8	I. S.
18	L	14 14.46	2.719	6 0 51.03	173.44	+28 17 7.3	+ 70.1	78.06	16 23.7	60 4.1	I. S.
19	U	2 47.11	2.714	6 35 33.44	173.24	28 14 39.0	− 94.9	78.04	16 23.9	60 5.0	I. S.
19	L	15 19.50	2.677	7 10 0.25	170.89	27 39 32.2	255.2	77.52	16 23.2	60 2.5	I. N.
20	U	3 51.23	2.607	7 43 47.51	166.72	26 33 15.1	405.5	76.55	16 21.7	59 57.1	I. N.
20	L	16 21.98	2.516	8 16 36.41	161.25	+24 58 22.9	−540.4	75.27	16 19.6	59 49.2	I. N.
21	U	4 51.57	2.413	8 48 14.83	155.08	22 58 15.9	657.6	73.78	16 16.8	59 39.1	I. N.
21	L	17 19.90	2.307	9 18 37.53	148.71	20 36 38.4	755.5	72.20	16 13.4	59 27.1	I. N.
22	U	5 46.98	2.206	9 47 44.95	142.60	17 57 19.1	834.6	70.65	16 9.8	59 13.7	I. N.
22	L	18 12.89	2.114	10 15 42.14	137.05	+15 3 58.8	−895.9	69.22	16 5.9	58 59.1	I. N.
23	U	6 37.77	2.034	10 42 37.06	132.25	12 0 2.7	940.8	67.96	16 1.8	58 43.8	I. N.
23	L	19 1.77	1.969	11 8 39.47	128.30	8 48 38.0	971.0	66.90	15 57.5	58 28.0	I. N.
24	U	7 25.08	1.917	11 34 0.00	125.27	5 32 34.3	987.5	66.06	15 53.1	58 11.9	I. N.
24	L	19 47.87	1.883	11 58 49.60	123.14	+ 2 14 25.2	−991.9	65.45	15 48.6	57 55.6	I. N.
25	U	8 10.33	1.861	12 23 19.00	121.90	− 1 3 27.8	984.9	65.08	15 44.1	57 39.2	I. N.
25	L	20 32.62	1.854	12 47 38.59	121.50	4 18 52.5	967.4	64.95	15 39.7	57 22.9	I. N.
26	U	8 54.92	1.861	13 11 58.14	121.89	7 29 43.2	939.4	65.02	15 35.3	57 6.8	I. N.
26	L	21 17.36	1.880	13 36 26.67	122.99	−10 33 57.8	−901.3	65.29	15 31.0	56 50.8	I. N.
27	U	9 40.08	1.909	14 1 12.25	124.71	13 29 35.5	853.3	65.74	15 26.7	56 35.0	I. N.
27	L	22 3.21	1.946	14 26 21.76	126.95	16 14 37.0	795.3	66.31	15 22.4	56 19.5	I. N.
28	U	10 26.82	1.990	14 52 0.62	129.58	18 47 3.2	727.4	66.99	15 18.3	56 4.3	I. N.
28	L	22 50.98	2.037	15 18 12.41	132.41	−21 4 57.7	−650.0	67.72	15 14.2	55 49.4	I. N. S.
29	U	11 15.71	2.084	15 44 58.50	135.26	23 6 27.1	563.4	68.46	15 10.3	55 35.0	I. N. S.
29	L	23 40.99	2.129	16 12 17.77	137.90	24 49 47.3	468.5	69.15	15 6.6	55 21.2	I. S.
30	U	12 6.76	2.166	16 40 6.40	140.11	26 13 25.8	366.8	69.72	15 3.0	55 8.0	*I.* II. S.
31	L	0 32.91	2.191	17 8 17.93	141.68	−27 16 8.6	−259.7	70.13	14 59.6	54 55.7	II. S.
31	U	12 59.29	2.203	17 36 43.52	142.44	27 57 3.9	149.3	70.34	14 56.5	54 44.2	II. S.
June 1	L	1 25.73	2.201	18 5 12.81	142.29	28 15 46.4	− 37.9	70.32	14 53.7	54 33.9	II. S.
1	U	13 52.06	2.184	18 33 34.75	141.22	28 12 18.6	+ 72.0	70.06	14 51.2	54 25.0	II. S.
2	L	2 18.08	2.151	19 1 38.53	139.30	−27 47 11.1	+178.4	69.60	14 49.2	54 17.6	II. N. S.
2	U	14 43.64	2.107	19 29 14.85	136.64	27 1 17.1	279.5	68.95	14 47.7	54 11.9	II. N. S.
3	L	3 8.63	2.056	19 56 16.34	133.52	25 55 50.4	373.7	68.16	14 46.6	54 8.0	II. N.
3	U	15 32.95	1.999	20 22 38.21	130.10	24 32 17.3	460.4	67.28	14 46.1	54 6.3	II. N.
4	L	3 56.58	1.940	20 48 18.28	126.58	−22 52 11.3	+539.2	66.38	14 46.2	54 6.7	II. N.
4	U	16 19.53	1.884	21 13 16.78	123.21	20 57 8.5	610.0	65.49	14 47.0	54 9.4	II. N.
5	L	4 41.82	1.832	21 37 36.16	120.09	18 48 42.8	673.0	64.65	14 48.4	54 14.6	II. N.
5	U	17 3.53	1.787	22 1 20.61	117.39	16 28 24.7	728.8	63.93	14 50.5	54 22.3	II. N.
6	L	5 24.75	1.750	22 24 35.76	115.22	−13 57 39.9	+777.7	63.33	14 53.3	54 32.6	II. N.
6	U	17 45.60	1.724	22 47 28.33	113.65	11 17 48.0	820.0	62.89	14 56.8	54 45.6	II. N.
7	L	6 6.20	1.710	23 10 5.95	112.74	8 30 6.6	855.9	62.64	15 1.1	55 1.1	II. N.
7	U	18 26.69	1.706	23 32 36.95	112.55	5 35 51.3	885.6	62.59	15 6.0	55 19.1	II. N.
8	L	6 47.21	1.716	23 55 10.32	113.14	− 2 36 17.7	+908.8	62.74	15 11.5	55 39.5	II. N.

AT TRANSIT OF MOON'S CENTER OVER THE MERIDIAN OF WASHINGTON.

Date.	Culmination.	Mean Time of Transit.	Diff. for 1 Hour of Long.	Right Ascension of Center.	Diff. for 1 Hour of Long.	Geocentric Declination of Center.	Diff. for 1 Hour of Long.	Sid. Time of Semid. Passing Meridian.	Geocentric Semidiameter.	Equatorial Horizontal Parallax.	Bright Limbs.
		h m	m	h m s	s	° ′ ″	″	s	′ ″	′ ″	
une 8	L	6 47.21	1.716	23 55 10.32	113.14	− 2 36 17.7	+ 908.8	62.74	15 11.5	55 39.5	II. N.
8	U	19 7.94	1.740	0 17 55.58	114.54	+ 0 27 13.4	925.1	63.13	15 17.7	56 2.2	II. N.
9	L	7 29.03	1.776	0 41 2.82	116.81	3 33 13.9	933.5	63.75	15 24.4	56 26.8	II. N.
9	U	19 50.67	1.830	1 4 42.68	119.99	6 40 3.5	933.0	64.61	15 31.6	56 53.0	II. N.
10	L	8 13.02	1.899	1 29 6.14	124.08	+ 9 45 45.6	+ 922.0	65.71	15 39.0	57 20.4	II. N.
10	U	20 36.29	1.981	1 54 24.45	129.12	12 48 2.3	898.4	67.04	15 46.7	57 48.7	II. N.
11	L	9 0.66	2.081	2 20 48.62	135.05	15 44 11.2	860.1	68.59	15 54.5	58 17.0	II. N.
11	U	21 26.29	2.193	2 48 28.81	141.77	18 31 0.8	804.8	70.31	16 2.1	58 44.9	II. N.
12	L	9 53.32	2.313	3 17 33.45	149.05	+21 4 51.6	+ 730.2	72.12	16 9.3	59 11.6	II. N.
12	U	22 21.83	2.439	3 48 7.15	156.57	23 21 38.9	634.1	73.96	16 16.1	59 36.5	II. N.
13	L	10 51.83	2.557	4 20 10.09	163.82	25 17 1.4	516.0	75.71	16 22.2	59 58.8	II. S.
13	U	23 23.19	2.664	4 53 35.31	170.18	26 46 40.1	376.9	77.22	16 27.4	60 17.8	
14	L	11 55.68	2.744	5 28 8.11	174.95	+27 46 40.8	+ 220.3	78.34	16 31.5	60 33.1	
15	U	0 28.91	2.789	6 3 26.06	177.62	28 14 3.1	+ 51.9	78.96	16 34.5	60 43.8	
15	L	13 2.44	2.791	6 39 1.17	177.80	28 7 7.3	− 121.2	79.02	16 36.2	60 50.1	I. S.
16	U	1 35.74	2.754	7 14 23.45	175.52	27 25 49.8	290.4	78.51	16 36.6	60 51.6	I. S.
16	L	14 8.38	2.680	7 49 5.18	171.13	+26 11 43.9	− 447.7	77.50	16 35.7	60 48.5	I. N.
17	U	2 39.98	2.581	8 22 44.51	165.23	24 27 44.2	587.5	76.12	16 33.7	60 40.9	I. N.
17	L	15 10.30	2.471	8 55 7.34	158.49	22 17 42.3	707.2	74.52	16 30.6	60 29.5	I. N.
18	U	3 39.25	2.354	9 26 7.47	151.55	19 45 57.4	805.5	72.83	16 26.5	60 14.7	I. N.
18	L	16 6.84	2.244	9 55 45.42	144.87	+16 56 54.2	− 881.7	71.17	16 21.7	59 57.1	I. N.
19	U	4 33.15	2.144	10 24 6.74	138.81	13 54 45.2	937.1	69.64	16 16.4	59 37.4	I. N.
19	L	16 58.34	2.057	10 51 20.26	133.59	10 43 20.9	974.2	68.30	16 10.5	59 16.0	I. N.
20	U	5 22.57	1.984	11 17 36.69	129.30	7 26 6.3	995.5	67.18	16 4.4	58 53.6	I. N.
20	L	17 46.05	1.930	11 43 7.56	126.00	+ 4 6 2.4	−1002.8	66.29	15 58.2	58 30.7	I. N.
21	U	6 8.97	1.891	12 8 4.51	123.66	+ 0 45 47.6	997.7	65.65	15 51.9	58 7.7	I. N.
21	L	18 31.51	1.867	12 32 39.00	122.24	− 2 32 17.8	981.4	65.25	15 45.7	57 45.0	I. N.
22	U	6 53.86	1.859	12 57 1.85	121.71	5 46 7.0	955.2	65.10	15 39.7	57 22.9	I. N.
22	L	19 16.18	1.863	13 21 23.23	121.99	− 8 53 43.1	− 919.3	65.16	15 33.9	57 1.6	I. N.
23	U	7 38.64	1.880	13 45 52.42	122.99	11 53 15.8	874.5	65.41	15 28.4	56 41.3	I. N.
23	L	20 1.36	1.907	14 10 37.65	124.64	14 42 57.8	820.9	65.83	15 23.1	56 22.1	I. N.
24	U	8 24.46	1.943	14 35 45.93	126.81	17 21 3.4	758.5	66.39	15 18.2	56 4.0	I. N.
24	L	20 48.04	1.986	15 1 22.63	129.36	−19 45 47.3	− 687.5	67.05	15 13.6	55 47.1	I. N.
25	U	9 12.14	2.031	15 27 31.38	132.12	21 55 26.5	607.7	67.75	15 9.3	55 31.4	I. N.
25	L	21 36.81	2.078	15 54 13.46	134.88	23 48 19.9	519.9	68.45	15 5.4	55 16.9	I. N.
26	U	10 2.00	2.120	16 21 27.64	137.42	25 22 53.6	424.7	69.08	15 1.8	55 3.6	I. N. *S.*
26	L	22 27.67	2.156	16 49 10.05	139.53	−26 37 44.5	− 323.1	69.60	14 58.4	54 51.5	I. *N.* S.
27	U	10 53.69	2.180	17 17 13.99	141.00	27 31 45.4	216.6	69.96	14 55.5	54 40.6	I. S.
27	L	23 19.93	2.190	17 45 30.82	141.65	28 4 10.4	− 107.3	70.11	14 52.8	54 30.8	I. S.
28	U	11 46.20	2.187	18 13 50.07	141.40	28 14 38.3	+ 2.6	70.03	14 50.5	54 22.2	I. S.
29	L	0 12.34	2.167	18 42 0.73	140.23	−28 3 15.3	+ 110.8	69.73	14 48.5	54 14.9	*I.* II. S.
29	U	12 38.16	2.133	19 9 52.26	138.22	27 30 34.5	215.2	69.22	14 46.9	54 9.0	II. S.
30	L	1 3.50	2.089	19 37 15.37	135.52	26 37 32.7	314.0	68.53	14 45.6	54 4.4	II. *N.* S.
30	U	13 28.26	2.036	20 4 2.93	132.33	25 25 26.3	405.8	67.71	14 44.8	54 1.3	II. *N.* S.
ly 1	L	1 52.34	1.978	20 30 10.22	128.86	−23 55 44.6	+ 489.2	66.81	14 44.3	53 59.6	II. N. S.

MOON-CULMINATIONS, 1912.

AT TRANSIT OF MOON'S CENTER OVER THE MERIDIAN OF WASHINGTON.

Date.	Culmination.	Mean Time of Transit.	Diff. for 1 Hour of Long.	Right Ascension of Center.	Diff. for 1 Hour of Long.	Geocentric Declination of Center.	Diff. for 1 Hour of Long.	Sid. Time of Semid. Passing Meridian.	Geocentric Semidiameter.	Equatorial Horizontal Parallax.	Bright Limbs.
		h m	m	h m s	s	° ′ ″	″	s	′ ″	′ ″	
July 1	L	1 52.34	1.978	20 30 10.22	128.86	−23 55 44.6	+ 489.2	66.81	14 44.3	53 59.6	II. N. S.
1	U	14 15.72	1.919	20 55 35.15	125.31	22 10 5.7	565.4	65.88	14 44.3	53 59.7	II. N.
2	L	2 38.40	1.862	21 20 18.00	121.87	20 10 10.2	631.9	64.97	14 44.9	54 1.6	II. N.
2	U	15 0.42	1.809	21 44 21.16	118.72	17 57 37.1	691.6	64.13	14 45.9	54 5.4	II. N.
3	L	3 21.85	1.764	22 7 48.77	115.98	−15 34 2.5	+ 742.9	63.40	14 47.5	54 11.2	II. N.
3	U	15 42.78	1.726	22 30 46.34	113.72	13 0 56.3	787.1	62.80	14 49.6	54 19.1	II. N.
4	L	4 3.32	1.699	22 53 20.50	112.09	10 19 44.5	824.0	62.36	14 52.4	54 29.3	II. N.
4	U	16 23.60	1.682	23 15 38.70	111.08	7 31 46.7	854.5	62.09	14 55.8	54 41.6	II. N.
5	L	4 43.75	1.677	23 37 49.07	110.80	− 4 38 20.8	+ 878.8	62.03	14 59.8	54 56.4	II. N.
5	U	17 3.91	1.685	0 0 0.43	111.25	− 1 40 43.4	896.5	62.19	15 4.4	55 13.5	II. N.
6	L	5 24.24	1.706	0 22 22.12	112.51	+ 1 19 47.4	907.6	62.56	15 9.8	55 33.0	II. N.
6	U	17 44.91	1.741	0 45 4.03	114.64	4 21 48.3	911.4	63.17	15 15.7	55 54.7	II. N.
7	L	6 6.10	1.791	1 8 16.62	117.62	+ 7 23 46.6	+ 906.9	64.02	15 22.2	56 18.6	II. N.
7	U	18 27.98	1.857	1 32 10.80	121.57	10 23 57.4	893.2	65.11	15 29.2	56 44.3	II. N.
8	L	6 50.72	1.938	1 56 57.84	126.44	13 20 17.1	868.1	66.43	15 36.7	57 11.8	II. N.
8	U	19 14.53	2.034	2 22 48.96	132.24	16 10 20.8	830.1	67.97	15 44.5	57 40.4	II. N.
9	L	7 39.59	2.145	2 49 54.90	138.89	+18 51 16.8	+ 776.4	69.69	15 52.5	58 9.9	II. N.
9	U	20 6.05	2.266	3 18 24.90	146.21	21 19 45.6	705.0	71.54	16 0.6	58 39.7	II. N.
10	L	8 34.01	2.394	3 48 25.41	153.90	23 31 59.7	613.7	73.44	16 8.6	59 9.0	II. N.
10	U	21 3.51	2.521	4 19 58.41	161.54	25 23 49.7	501.0	75.28	16 16.3	59 37.2	II. N.
11	L	9 34.47	2.636	4 52 59.60	168.49	+26 50 58.7	+ 366.6	76.92	16 23.4	60 3.4	II. N.
11	U	22 6.70	2.730	5 27 16.98	174.11	27 49 23.1	214.1	78.23	16 29.8	60 26.9	II. S.
12	L	10 39.86	2.791	6 2 30.47	177.75	28 15 39.6	+ 46.8	79.05	16 35.3	60 46.8	II. S.
12	U	23 13.52	2.811	6 38 13.38	178.97	28 7 36.5	− 127.7	79.32	16 39.5	61 2.5	
13	L	11 47.15	2.789	7 13 55.54	177.64	+27 24 34.4	− 301.5	79.00	16 42.5	61 13.2	
14	U	0 20.29	2.729	7 49 7.63	174.02	26 7 36.3	465.9	78.15	16 44.0	61 18.7	
14	L	12 52.53	2.640	8 23 25.28	168.66	24 19 17.8	613.9	76.89	16 44.0	61 18.9	
15	U	1 23.58	2.533	8 56 31.51	162.24	22 3 26.1	740.8	75.37	16 42.6	61 13.7	I. N.
15	L	13 53.29	2.419	9 28 17.51	155.41	+19 24 31.2	− 844.2	73.72	16 39.8	61 3.3	I. N.
16	U	2 21.65	2.308	9 58 41.85	148.70	16 27 18.0	923.8	72.07	16 35.7	60 48.3	I. N.
16	L	14 48.71	2.205	10 27 48.65	142.54	13 16 27.5	980.8	70.53	16 30.5	60 29.4	I. N.
17	U	3 14.63	2.116	10 55 45.95	137.17	9 56 20.8	1017.0	69.17	16 24.5	60 7.2	I. N.
17	L	15 39.56	2.042	11 22 44.05	132.69	+ 6 30 52.8	−1034.8	68.03	16 17.8	59 42.6	I. N.
18	U	4 3.69	1.984	11 48 54.36	129.19	+ 3 3 29.9	1036.5	67.12	16 10.6	59 16.1	I. N.
18	L	16 27.23	1.942	12 14 28.59	126.67	− 0 22 47.4	1024.0	66.46	16 3.1	58 48.7	I. N.
19	U	4 50.35	1.915	12 39 38.18	125.08	3 45 23.1	999.8	66.05	15 55.5	58 20.8	I. N.
19	L	17 13.25	1.903	13 4 34.05	124.38	− 7 1 59.8	− 964.6	65.88	15 47.9	57 53.1	I. N.
20	U	5 36.09	1.905	13 29 26.33	124.47	10 10 35.6	919.8	65.91	15 40.6	57 26.1	I. N.
20	L	17 59.02	1.919	13 54 24.24	125.30	13 9 19.0	866.0	66.14	15 33.5	57 0.2	I. N.
21	U	6 22.17	1.943	14 19 35.80	126.74	15 56 26.8	803.8	66.52	15 26.8	56 35.6	I. N.
21	L	18 45.67	1.975	14 45 7.67	128.65	−18 30 19.8	− 733.6	67.03	15 20.5	56 12.6	I. N.
22	U	7 9.59	2.012	15 11 4.90	130.92	20 49 23.5	655.6	67.62	15 14.7	55 51.3	I. N.
22	L	19 33.98	2.052	15 37 30.54	133.36	22 52 6.5	570.2	68.24	15 9.5	55 31.9	I. N.
23	U	7 58.85	2.093	16 4 25.47	135.77	24 37 2.2	478.0	68.84	15 4.7	55 14.4	I. N.
23	L	20 24.19	2.129	16 31 48.01	137.94	−26 2 52.1	− 379.5	69.38	15 0.5	54 58.9	I. N.

MOON-CULMINATIONS, 1912.

AT TRANSIT OF MOON'S CENTER OVER THE MERIDIAN OF WASHINGTON.

Date.	Culmination.	Mean Time of Transit.	Diff. for 1 Hour of Long.	Right Ascension of Center.	Diff. for 1 Hour of Long.	Geocentric Declination of Center.	Diff. for 1 Hour of Long.	Sid. Time of Semid. Passing Meridian.	Geocentric Semidiameter.	Equatorial Horizontal Parallax.	Bright Limbs.
		h m	m	h m s	s	° ′ ″	″	s	′ ″	′ ″	
ly 23	L	20 24.19	2.129	16 31 48.01	137.94	−26 2 52.1	− 379.5	69.38	15 0.5	54 58.9	I. N.
24	U	8 49.91	2.157	16 59 33.95	139.64	27 8 28.6	275.9	69.79	14 56.8	54 45.3	I. N. *S.*
24	L	21 15.91	2.175	17 27 36.71	140.71	27 52 59.5	168.8	70.03	14 53.5	54 33.4	I. *N.* S.
25	U	9 42.05	2.180	17 55 47.68	141.00	28 15 52.8	− 59.9	70.07	14 50.8	54 23.4	I. S.
25	L	22 8.17	2.171	18 23 57.03	140.43	−28 16 59.3	+ 48.7	69.89	14 48.5	54 15.0	I. S.
26	U	10 34.08	2.147	18 51 54.56	139.04	27 56 34.2	155.1	69.50	14 46.7	54 8.4	I. S.
26	L	22 59.64	2.111	19 19 30.60	136.88	27 15 16.8	257.3	68.92	14 45.3	54 3.3	I. S.
27	U	11 24.71	2.065	19 46 36.96	134.10	26 14 7.8	353.3	68.18	14 44.4	53 59.7	I. S.
27	L	23 49.18	2.012	20 13 7.36	130.91	−24 54 25.2	+ 442.4	67.32	14 43.8	53 57.7	I. S.
28	U	12 12.98	1.955	20 38 57.91	127.50	23 17 39.6	523.8	66.40	14 43.6	53 56.9	*I.* II. S.
29	L	0 36.10	1.898	21 4 7.05	124.05	21 25 28.8	596.7	65.47	14 43.8	53 57.7	II. *N.* S.
29	U	12 58.54	1.843	21 28 35.43	120.73	19 19 34.1	661.0	64.58	14 44.4	54 0.0	II. *N.* S.
30	L	1 20.35	1.792	21 52 25.56	117.69	−17 1 36.2	+ 717.2	63.75	14 45.4	54 3.6	II. N. *S.*
30	U	13 41.58	1.748	22 15 41.55	115.04	14 33 13.8	765.2	63.04	14 46.8	54 8.9	II. N.
31	L	2 2.34	1.713	22 38 28.76	112.91	11 56 1.4	805.6	62.45	14 48.7	54 15.6	II. N.
31	U	14 22.73	1.686	23 0 53.53	111.33	9 11 28.8	838.6	62.03	14 50.9	54 23.9	II. N.
ug. 1	L	2 42.86	1.671	23 23 2.95	110.37	− 6 21 2.8	+ 864.5	61.78	14 53.6	54 34.0	II. N.
1	U	15 2.86	1.665	23 45 4.75	110.07	3 26 7.0	883.6	61.73	14 56.9	54 45.9	II. N.
2	L	3 22.88	1.672	0 7 7.27	110.48	− 0 28 3.7	895.8	61.89	15 0.6	54 59.5	II. N.
2	U	15 43.05	1.692	0 29 19.29	111.65	+ 2 31 43.5	900.9	62.26	15 4.9	55 15.1	II. N.
3	L	4 3.54	1.725	0 51 50.15	113.62	+ 5 31 47.6	+ 898.5	62.85	15 9.6	55 32.5	II. N.
3	U	16 24.50	1.771	1 14 49.62	116.43	8 30 34.9	888.0	63.66	15 14.9	55 51.8	II. N.
4	L	4 46.10	1.832	1 38 27.87	120.10	11 26 21.8	868.3	64.71	15 20.7	56 13.0	II. N.
4	U	17 8.53	1.908	2 2 55.30	124.64	14 17 10.9	838.0	65.98	15 27.0	56 36.1	II. N.
5	L	5 31.95	1.997	2 28 22.39	130.03	+17 0 46.7	+ 795.7	67.44	15 33.7	57 0.7	II. N.
5	U	17 56.52	2.100	2 54 59.02	136.21	19 34 33.6	739.5	69.08	15 40.7	57 26.7	II. N.
6	L	6 22.39	2.213	3 22 53.80	143.02	21 55 32.3	667.4	70.84	15 48.1	57 53.9	II. N.
6	U	18 49.66	2.333	3 52 12.96	150.21	24 0 20.6	577.5	72.66	15 55.7	58 21.8	II. N.
7	L	7 18.38	2.453	4 22 58.98	157.41	+25 45 17.8	+ 468.8	74.43	16 3.4	58 49.9	II. N.
7	U	19 48.49	2.564	4 55 8.92	164.10	27 6 34.6	341.0	76.04	16 11.0	59 17.6	II. N.
8	L	8 19.84	2.657	5 28 33.29	169.71	28 0 28.7	195.4	77.35	16 18.2	59 44.2	II. S.
8	U	20 52.15	2.723	6 2 55.53	173.66	28 23 48.3	+ 35.9	78.25	16 25.0	60 9.1	II. S.
9	L	9 25.05	2.753	6 37 52.89	175.52	+28 14 16.3	− 132.1	78.65	16 31.0	60 31.2	II. S.
9	U	21 58.09	2.747	7 12 58.93	175.10	27 30 52.2	301.5	78.52	16 36.1	60 50.0	II. S.
10	L	10 30.82	2.704	7 47 46.92	172.56	26 14 4.7	464.7	77.90	16 40.1	61 4.6	II. S.
10	U	23 2.88	2.634	8 21 53.58	168.30	24 25 49.3	615.1	76.86	16 42.8	61 14.5	II. S.
11	L	11 33.95	2.544	8 55 1.54	162.88	+22 9 16.1	− 747.0	75.55	16 44.1	61 19.3	
12	U	0 3.88	2.444	9 27 0.54	156.90	19 28 27.9	857.2	74.08	16 44.0	61 18.7	
12	L	12 32.61	2.344	9 57 47.21	150.90	16 27 56.2	944.1	72.60	16 42.3	61 12.7	
13	U	1 0.17	2.251	10 27 23.71	145.26	13 12 20.8	1007.9	71.19	16 39.3	61 1.7	
13	L	13 26.67	2.168	10 55 56.29	140.29	+ 9 46 15.3	−1049.4	69.93	16 35.0	60 45.8	I. N.
14	U	1 52.26	2.099	11 23 33.83	136.11	6 13 55.3	1070.6	68.87	16 29.5	60 25.6	I. N.
14	L	14 17.10	2.044	11 50 26.58	132.82	+ 2 39 13.4	1073.4	68.03	16 23.1	60 2.1	I. N.
15	U	2 41.37	2.004	12 16 45.41	130.46	− 0 54 22.2	1060.0	67.43	16 16.0	59 35.9	I. N.
15	L	15 5.26	1.980	12 42 41.10	128.96	− 4 23 47.8	−1032.1	67.06	16 8.3	59 7.8	I. N

AT TRANSIT OF MOON'S CENTER OVER THE MERIDIAN OF WASHINGTON.

Date.	Culmination.	Mean Time of Transit.	Diff. for 1 Hour of Long.	Right Ascension of Center.	Diff. for 1 Hour of Long.	Geocentric Declination of Center.	Diff. for 1 Hour of Long.	Sid. Time of Semid. Passing Meridian.	Geocentric Semidiameter.	Equatorial Horizontal Parallax.	Bright Limbs.
		h m	m	h m s	s	° ′ ″	″	s	′ ″	′ ″	
Aug. 15	L	15 5.26	1.980	12 42 41.10	128.96	− 4 23 47.8	−1032.1	67.06	16 8.3	59 7.8	I. N.
16	U	3 28.94	1.969	13 8 23.96	128.30	7 46 21.1	991.5	66.90	16 0.3	58 38.5	I. N.
16	L	15 52.57	1.970	13 34 3.58	128.41	10 59 39.6	939.8	66.97	15 52.2	58 8.8	I. N.
17	U	4 16.28	1.984	13 59 48.54	129.19	14 1 36.2	878.1	67.21	15 44.2	57 39.3	I. N.
17	L	16 40.20	2.006	14 25 46.18	130.51	−16 50 16.7	− 807.2	67.58	15 36.4	57 10.7	I. N.
18	U	5 4.44	2.034	14 52 2.32	132.25	19 23 57.2	728.0	68.07	15 28.9	56 43.3	I. N.
18	L	17 29.04	2.067	15 18 41.05	134.24	21 41 2.9	641.4	68.62	15 21.8	56 17.4	I. N.
19	U	5 54.06	2.102	15 45 44.36	136.31	23 40 7.7	548.1	69.15	15 15.3	55 53.5	I. N.
19	L	18 19.48	2.134	16 13 11.98	138.25	−25 19 54.7	− 448.9	69.65	15 9.4	55 31.7	I. N.
20	U	6 45.26	2.161	16 41 1.18	139.87	26 39 19.1	344.6	70.06	15 4.1	55 12.3	I. N.
20	L	19 11.31	2.180	17 9 6.98	140.99	27 37 29.7	236.6	70.33	14 59.4	54 55.2	I. N.
21	U	7 37.52	2.187	17 37 22.28	141.44	28 13 53.5	126.9	70.42	14 55.4	54 40.5	I. N.S.
21	L	20 3.75	2.182	18 5 38.52	141.13	−28 28 17.0	− 17.0	70.31	14 52.1	54 28.2	I. S.
22	U	8 29.84	2.164	18 33 46.35	140.04	28 20 48.2	+ 91.4	69.99	14 49.4	54 18.3	I. S.
22	L	20 55.63	2.134	19 1 36.61	138.22	27 51 57.2	196.4	69.48	14 47.3	54 10.5	I. S.
23	U	9 21.00	2.093	19 29 1.01	135.76	27 2 34.3	296.5	68.80	14 45.8	54 5.0	I. S.
23	L	21 45.82	2.044	19 55 52.86	132.82	−25 53 46.6	+ 390.4	67.99	14 44.8	54 1.5	I. S.
24	U	10 10.03	1.990	20 22 7.48	129.58	24 26 55.6	476.9	67.10	14 44.4	53 59.8	I. S.
24	L	22 33.57	1.934	20 47 42.32	126.23	22 43 31.3	555.8	66.16	14 44.4	54 0.0	I. S.
25	U	10 56.45	1.879	21 12 36.99	122.92	20 45 9.7	626.4	65.24	14 44.9	54 1.7	I. S.
25	L	23 18.69	1.827	21 36 52.96	119.80	−18 33 29.4	+ 688.9	64.36	14 45.8	54 5.0	I. S.
26	U	11 40.33	1.781	22 0 33.35	117.00	16 10 8.8	743.2	63.57	14 47.1	54 9.7	I. S.
27	L	0 1.45	1.741	22 23 42.59	114.63	13 36 44.7	789.4	62.90	14 48.7	54 15.8	I. II. S.
27	U	12 22.15	1.710	22 46 26.15	112.74	10 54 52.3	828.0	62.37	14 50.7	54 23.1	II. N.S.
28	L	0 42.53	1.688	23 8 50.29	111.40	− 8 6 4.1	+ 858.9	61.99	14 53.0	54 31.5	II. N.S.
28	U	13 2.69	1.675	23 31 1.97	110.66	5 11 50.8	882.2	61.80	14 55.6	54 41.2	II. N.
29	L	1 22.78	1.674	23 53 8.62	110.56	− 2 13 42.9	897.8	61.79	14 58.6	54 51.9	II. N.
29	U	13 42.91	1.684	0 15 18.13	111.15	+ 0 46 49.0	906.1	61.98	15 1.8	55 3.9	II. N.
30	L	2 3.23	1.705	0 37 38.87	112.41	+ 3 48 12.2	+ 906.4	62.38	15 5.4	55 17.0	II. N.
30	U	14 23.88	1.739	1 0 19.50	114.47	6 48 49.7	898.3	62.99	15 9.3	55 31.3	II. N.
31	L	2 45.01	1.785	1 23 29.03	117.26	9 46 58.2	881.5	63.81	15 13.5	55 46.8	II. N.
31	U	15 6.77	1.841	1 47 16.69	120.82	12 40 45.7	854.7	64.84	15 18.1	56 3.5	II. N.
Sept. 1	L	3 29.32	1.916	2 11 51.76	125.16	+15 28 8.7	+ 817.2	66.06	15 22.9	56 21.3	II. N.
1	U	15 52.81	2.001	2 37 23.21	130.21	18 6 49.8	767.5	67.45	15 28.1	56 40.4	II. N.
2	L	4 17.37	2.095	3 3 59.23	135.90	20 34 16.1	704.4	68.99	15 33.6	57 0.7	II. N.
2	U	16 43.12	2.197	3 31 46.56	142.06	22 47 38.3	626.6	70.62	15 39.4	57 22.0	II. N.
3	L	5 10.12	2.301	4 0 49.43	148.41	+24 43 52.3	+ 532.9	72.26	15 45.4	57 44.0	II. N.
3	U	17 38.39	2.407	4 31 8.48	154.68	26 19 43.5	423.0	73.83	15 51.7	58 6.8	II. N.
4	L	6 7.86	2.502	5 2 39.67	160.36	27 31 56.7	296.8	75.23	15 58.0	58 30.0	II. N.
4	U	18 38.37	2.579	5 35 13.50	165.03	28 17 28.5	156.3	76.36	16 4.3	58 53.1	II. N.
5	L	7 9.67	2.633	6 8 34.92	168.25	+28 33 45.2	+ 4.9	77.11	16 10.4	59 15.7	II. S.
5	U	19 41.44	2.650	6 42 24.34	169.68	28 19 0.1	− 153.1	77.42	16 16.4	59 37.4	II. S.
6	L	8 13.30	2.649	7 16 19.75	169.24	27 32 28.3	311.9	77.29	16 21.8	59 57.4	II. S.
6	U	20 44.90	2.613	7 49 59.26	167.08	26 14 35.5	465.6	76.74	16 26.6	60 15.0	II. S.
7	L	9 15.92	2.554	8 23 3.98	163.50	+24 26 56.3	− 608.7	75.84	16 30.6	60 29.8	II. S.

AT TRANSIT OF MOON'S CENTER OVER THE MERIDIAN OF WASHINGTON.

Date.	Culmination.	Mean Time of Transit.	Diff. for 1 Hour of Long.	Right Ascension of Center.	Diff. for 1 Hour of Long.	Geocentric Declination of Center.	Diff. for 1 Hour of Long.	Sid. Time of Semid. Passing Meridian.	Geocentric Semidiameter.	Equatorial Horizontal Parallax.	Bright Limbs.
		h m	m	h m s	s	° ′ ″	″	s	′ ″	′ ″	
pt. 7	L	9 15.92	2.554	8 23 3.98	163.50	+24 26 56.3	− 608.7	75.84	16 30.6	60 29.8	II. S.
7	U	21 46.13	2.479	8 55 19.79	159.00	22 12 5.8	736.8	74.71	16 33.7	60 41.2	II. S.
8	L	10 15.39	2.397	9 26 38.27	154.03	19 33 24.9	846.6	73.46	16 35.8	60 48.6	II. S.
8	U	22 43.65	2.313	9 56 56.61	149.04	16 34 45.0	936.5	72.19	16 36.6	60 51.6	II. S.
9	L	11 10.93	2.236	10 26 16.60	144.37	+13 20 12.9	−1005.3	70.99	16 36.1	60 50.0	
9	U	23 37.34	2.167	10 54 43.64	140.25	9 53 59.2	1053.5	69.92	16 34.4	60 43.7	
10	L	12 3.00	2.111	11 22 25.47	136.85	6 20 9.0	1081.6	69.03	16 31.5	60 33.0	
11	U	0 28.05	2.068	11 49 31.28	134.25	+ 2 42 36.7	1090.9	68.35	16 27.4	60 17.9	
11	L	12 52.67	2.038	12 16 10.83	132.48	− 0 54 57.9	−1082.4	67.90	16 22.3	59 59.1	
12	U	1 17.02	2.022	12 42 33.98	131.51	4 29 12.4	1057.5	67.67	16 16.2	59 37.0	I. N.
12	L	13 41.26	2.019	13 8 50.25	131.30	7 57 0.4	1018.0	67.64	16 9.4	59 12.0	I. N.
13	U	2 5.52	2.027	13 35 8.32	131.79	11 15 33.2	965.2	67.80	16 2.2	58 45.3	I. N.
13	L	14 29.94	2.045	14 1 35.91	132.88	−14 22 17.8	− 900.2	68.12	15 54.5	58 17.3	I. N.
14	U	2 54.63	2.070	14 28 19.38	134.42	17 14 56.3	824.4	68.56	15 46.7	57 48.8	I. N.
14	L	15 19.65	2.101	14 55 23.33	136.27	19 51 25.6	738.9	69.08	15 39.0	57 20.5	I. N.
15	U	3 45.06	2.134	15 22 50.47	138.26	22 9 56.4	644.8	69.63	15 31.5	56 52.8	I. N.
15	L	16 10.87	2.166	15 50 41.20	140.17	−24 8 54.7	− 543.6	70.16	15 24.3	56 26.3	I. N.
16	U	4 37.03	2.193	16 18 53.48	141.82	25 47 2.3	436.7	70.61	15 17.5	56 1.5	I. N.
16	L	17 3.48	2.213	16 47 22.86	142.99	27 3 19.5	325.6	70.93	15 11.3	55 38.6	I. N.
17	U	5 30.10	2.222	17 16 2.72	143.54	27 57 6.3	212.0	71.08	15 5.7	55 18.0	I. N.
17	L	17 56.76	2.219	17 44 44.70	143.34	−28 28 5.1	− 97.3	71.03	15 0.8	55 0.0	I. N.
18	U	6 23.29	2.202	18 13 19.64	142.35	28 36 21.4	+ 14.8	70.77	14 56.5	54 44.5	I. S.
18	L	18 49.55	2.173	18 41 38.14	140.60	28 22 22.8	124.3	70.30	14 53.0	54 31.6	I. S.
19	U	7 15.40	2.133	19 9 31.55	138.20	27 46 57.6	229.0	69.66	14 50.2	54 21.4	I. S.
19	L	19 40.72	2.084	19 36 52.77	135.27	−26 51 10.9	+ 327.7	68.87	14 48.2	54 13.9	I. S.
20	U	8 5.41	2.030	20 3 36.64	132.00	25 36 21.2	419.4	67.97	14 46.9	54 9.0	I. S.
20	L	20 29.43	1.973	20 29 40.14	128.57	24 3 55.7	503.6	67.01	14 46.2	54 6.6	I. S.
21	U	8 52.77	1.916	20 55 2.42	125.16	22 15 27.1	579.9	66.05	14 46.2	54 6.5	I. S.
21	L	21 15.43	1.862	21 19 44.57	121.91	−20 12 29.5	+ 648.3	65.13	14 46.8	54 8.6	I. S.
22	U	9 37.48	1.813	21 43 49.36	118.95	17 56 37.4	709.1	64.27	14 47.9	54 12.7	I. S.
22	L	21 58.98	1.771	22 7 20.98	116.39	15 29 24.0	761.9	63.52	14 49.5	54 18.6	I. S.
23	U	10 20.01	1.736	22 30 24.61	114.30	12 52 20.9	807.3	62.90	14 51.6	54 26.2	I. S.
23	L	22 40.68	1.710	22 53 6.33	112.75	−10 6 58.4	+ 845.2	62.44	14 54.0	54 35.2	I. S.
24	U	11 1.09	1.694	23 15 32.81	111.77	7 14 46.4	875.5	62.14	14 56.8	54 45.5	I. S.
24	L	23 21.37	1.688	23 37 51.26	111.43	4 17 15.3	898.3	62.02	14 59.9	54 56.9	I. S.
25	U	11 41.65	1.693	0 0 9.26	111.70	− 1 15 57.5	913.3	62.10	15 3.3	55 9.2	I. *II. N.* S.
26	L	0 2.04	1.709	0 22 34.78	112.68	+ 1 47 31.1	+ 919.9	62.38	15 6.8	55 22.2	II. N. *S.*
26	U	12 22.71	1.736	0 45 16.08	114.33	4 51 29.0	918.1	62.86	15 10.5	55 35.9	II. N.
27	L	0 43.77	1.776	1 8 21.61	116.72	7 54 8.1	906.7	63.54	15 14.4	55 50.0	II. N.
27	U	13 5.38	1.828	1 31 59.99	119.82	10 53 31.8	885.4	64.42	15 18.3	56 4.5	II. N.
28	L	1 27.68	1.891	1 56 19.82	123.63	+13 47 32.4	+ 852.7	65.50	15 22.4	56 19.5	II. N.
28	U	13 50.80	1.965	2 21 29.39	128.09	16 33 51.1	808.3	66.74	15 26.6	56 34.7	II. N.
29	L	2 14.88	2.049	2 47 36.29	133.14	19 9 56.0	750.3	68.12	15 30.8	56 50.2	II. N.
29	U	14 40.01	2.141	3 14 46.77	138.66	21 33 2.9	678.3	69.60	15 35.1	57 5.9	II. N
30	L	3 6.27	2.236	3 43 5.04	144.41	+23 40 17.0	+ 591.4	71.12	15 39.4	57 21.7	II.

AT TRANSIT OF MOON'S CENTER OVER THE MERIDIAN OF WASHINGTON.

Date.	Culmination.	Mean Time of Transit.	Diff. for 1 Hour of Long.	Right Ascension of Center.	Diff. for 1 Hour of Long.	Geocentric Declination of Center.	Diff. for 1 Hour of Long.	Sid. Time of Semid. Passing Meridian.	Geocentric Semidiameter.	Equatorial Horizontal Parallax.	Bright Limbs.
		h m	m	h m s	s	° ′ ″	″	s	′ ″	′ ″	
Sep. 30	L	3 6.27	2.236	3 43 5.04	144.41	+23 40 17.0	+ 591.4	71.12	15 39.4	57 21.7	II. N.
30	U	15 33.68	2.331	4 12 32.30	150.10	25 28 36.4	489.3	72.60	15 43.7	57 37.6	II. N.
Oct. 1	L	4 2.19	2.419	4 43 5.81	155.37	26 55 0.6	372.3	73.95	15 48.1	57 53.7	II. N.
1	U	16 31.68	2.493	5 14 38.26	159.85	27 56 40.0	242.2	75.07	15 52.5	58 9.8	II. N.
2	L	5 1.95	2.547	5 46 57.52	163.12	+28 31 9.3	+ 101.1	75.89	15 56.8	58 25.8	II. N.
2	U	17 32.72	2.577	6 19 47.35	164.90	28 36 41.3	− 46.8	76.33	16 1.1	58 41.5	II. S.
3	L	6 3.67	2.580	6 52 48.72	165.05	28 12 17.0	197.2	76.37	16 5.2	58 56.6	II. S.
3	U	18 34.51	2.556	7 25 42.22	163.61	27 17 54.1	345.4	76.02	16 9.2	59 11.1	II. S.
4	L	7 4.94	2.509	7 58 10.24	160.83	+25 54 30.4	− 486.8	75.32	16 12.8	59 24.5	II. S.
4	U	19 34.69	2.447	8 29 58.59	157.06	24 3 54.7	616.9	74.38	16 16.1	59 36.5	II. S.
5	L	8 3.62	2.374	9 0 57.69	152.71	21 48 35.7	733.5	73.27	16 18.9	59 46.7	II. S.
5	U	20 31.67	2.299	9 31 3.16	148.19	19 11 33.3	834.1	72.10	16 21.1	59 54.8	II. S.
6	L	8 58.82	2.227	10 0 15.01	143.84	+16 16 5.9	− 917.5	70.96	16 22.6	60 0.2	II. S.
6	U	21 25.14	2.161	10 28 36.92	139.90	13 5 42.3	983.4	69.92	16 23.3	60 2.8	II. S.
7	L	9 50.74	2.106	10 56 15.15	136.58	9 43 53.9	1031.6	69.02	16 23.1	60 2.3	II. S.
7	U	22 15.74	2.064	11 23 17.85	134.00	6 14 11.1	1062.5	68.31	16 22.1	59 58.4	II. S.
8	L	10 40.31	2.033	11 49 54.13	132.18	+ 2 40 1.1	−1076.3	67.81	16 20.1	59 51.2	II. S.
8	U	23 4.59	2.017	12 16 13.56	131.18	− 0 55 14.7	1073.6	67.53	16 17.2	59 40.6	
9	L	11 28.76	2.013	12 42 25.66	130.96	4 28 22.1	1054.9	67.46	16 13.5	59 26.8	
9	U	23 52.95	2.021	13 8 39.56	131.47	7 56 13.9	1021.1	67.60	16 8.9	59 10.0	
10	L	12 17.32	2.041	13 35 3.62	132.64	−11 15 51.2	− 972.7	67.91	16 3.6	58 50.5	
11	U	0 41.97	2.069	14 1 45.04	134.35	14 24 24.8	910.7	68.38	15 57.7	58 28.9	
11	L	13 7.00	2.104	14 28 49.58	136.47	17 19 15.9	835.8	68.95	15 51.3	58 5.6	I. N.
12	U	1 32.49	2.143	14 56 21.06	138.80	19 57 58.4	749.4	69.59	15 44.7	57 41.3	I. N.
12	L	13 58.44	2.183	15 24 21.00	141.16	−22 18 20.4	− 652.6	70.24	15 38.0	57 16.5	I. N.
13	U	2 24.86	2.219	15 52 48.32	143.33	24 18 28.3	547.3	70.83	15 31.2	56 51.6	I. N.
13	L	14 51.64	2.247	16 21 39 17	145.05	25 56 49.0	435.2	71.31	15 24.6	56 27.3	I. N.
14	U	3 18.74	2.265	16 50 47.07	146.12	27 12 14.3	318.5	71.62	15 18.2	56 4.0	I. N.
14	L	15 45.97	2.270	17 20 3.23	146.40	−28 4 3.2	− 199.4	71.72	15 12.2	55 42.1	I. N.
15	U	4 13.16	2.259	17 49 17.38	145.78	28 32 3.8	− 80.8	71.60	15 6.8	55 22.1	I. N.
15	L	16 40.13	2.234	18 18 18.61	144.28	28 36 33.0	+ 35.4	71.24	15 2.0	55 4.4	I. N.
16	U	5 6.72	2.195	18 46 56.62	141.94	28 18 14.2	147.0	70.66	14 57.8	54 49.0	I. S.
16	L	17 32.78	2.145	19 15 2.45	138.94	−27 38 12.7	+ 252.2	69.89	14 54.3	54 36.1	I. S.
17	U	5 58.18	2.088	19 42 29.28	135.47	26 37 50.5	350.2	68.99	14 51.5	54 26.0	I. S.
17	L	18 22.87	2.026	20 9 12.76	131.75	25 18 40.4	440.1	68.00	14 49.5	54 18.7	I. S.
18	U	6 46.80	1.963	20 35 11.06	127.98	23 42 20.4	522.1	66.97	14 48.3	54 14.2	I. S.
18	L	19 10.00	1.903	21 0 24.71	124.34	−21 50 29.2	+ 595.3	65.97	14 47.8	54 12.5	I. S.
19	U	7 32.49	1.847	21 24 56.16	120.97	19 44 43.6	661.0	65.02	14 48.1	54 13.4	I. S.
19	L	19 54.35	1.797	21 48 49.58	118.00	17 26 36.7	718.9	64.16	14 49.0	54 17.0	I. S.
20	U	8 15.66	1.756	22 12 10.28	115.52	14 57 37.6	769.7	63.44	14 50.7	54 23.1	I. S.
20	L	20 36.54	1.724	22 35 4.60	113.61	−12 19 11.5	+ 813.5	62.87	14 53.0	54 31.4	I. S.
21	U	8 57.09	1.703	22 57 39.48	112.30	9 32 40.5	850.5	62.45	14 55.8	54 41.8	I. S.
21	L	21 17.45	1.691	23 20 2.44	111.61	6 39 27.1	880.5	62.22	14 59.1	54 54.0	I. S.
22	U	9 37.74	1.692	23 42 21.47	111.64	3 40 55.3	903.5	62.19	15 2.9	55 7.9	I. S.
22	*L*	*21 58.10*	1.704	0 4 44.75	112.36	− 0 38 32.0	+ 919.1	62.36	15 7.0	55 23.1	I. S.

AT TRANSIT OF MOON'S CENTER OVER THE MERIDIAN OF WASHINGTON.

Date.	Culmination.	Mean Time of Transit.	Diff. for 1 Hour of Long.	Right Ascension of Center.	Diff. for 1 Hour of Long.	Geocentric Declination of Center.	Diff. for 1 Hour of Long.	Sid. Time of Semid. Passing Meridian.	Geocentric Semidiameter.	Equatorial Horizontal Parallax.	Bright Limbs.
		h m	m	h m s	s	° ′ ″	″	s	′ ″	′ ″	
ct. 23	U	10 18.67	1.728	0 27 20.85	113.79	+ 2 26 9.5	+ 926.4	62.74	15 11.5	55 39.3	I. S.
23	L	22 39.61	1.763	0 50 18.58	115.96	5 31 27.0	924.9	63.33	15 16.1	55 56.2	I. S.
24	U	11 1.05	1.812	1 13 46.88	118.88	8 35 27.9	913.5	64.13	15 20.8	56 13.6	I. S.
24	L	23 23.15	1.873	1 37 54.73	122.55	11 36 6.0	890.9	65.14	15 25.6	56 31.2	I. *N.* S.
25	U	11 46.05	1.946	2 2 50.91	126.94	+14 31 0.7	+ 856.0	66.33	15 30.4	56 48.7	*I.* II. N. *S.*
26	L	0 9.89	2.029	2 28 43.57	131.95	17 17 34.9	807.2	67.68	15 35.0	57 5.6	II. N.
26	U	12 34.79	2.121	2 55 39.71	137.48	19 52 55.8	743.6	69.14	15 39.4	57 21.9	II. N.
27	L	1 0.82	2.218	3 23 44.35	143.32	22 13 57.3	663.9	70.66	15 43.7	57 37.5	II. N.
27	U	13 28.03	2.316	3 52 59.61	149.19	+24 17 24.2	+ 567.8	72.18	15 47.6	57 52.1	II. N.
28	L	1 56.38	2.408	4 23 23.71	154.72	25 59 59.6	455.5	73.59	15 51.3	58 5.6	II. N.
28	U	14 25.77	2.487	4 54 50.10	159.50	27 18 36.9	328.5	74.81	15 54.7	58 17.9	II. N.
29	L	2 56.00	2.547	5 27 7.04	163.08	28 10 34.2	189.5	75.71	15 57.7	58 29.1	II. N.
29	U	15 26.80	2.581	5 59 58.16	165.15	+28 33 48.8	+ 42.1	76.25	16 0.5	58 39.1	II. N.
30	L	3 57.84	2.587	6 33 3.86	165.49	28 27 10.6	− 108.7	76.37	16 2.9	58 47.9	II. *N.* S.
30	U	16 28.77	2.564	7 6 3.36	164.14	27 50 29.4	257.6	76.07	16 4.9	58 55.5	II. S.
31	L	4 59.28	2.517	7 38 37.35	161.31	26 44 35.7	399.9	75.40	16 6.7	59 1.9	II. S.
31	U	17 29.11	2.451	8 10 30.05	157.33	+25 11 13.5	− 531.7	74.44	16 8.2	59 7.3	II. S.
ov. 1	L	5 58.07	2.374	8 41 30.56	152.68	23 12 48.1	650.1	73.31	16 9.3	59 11.5	II. S.
1	U	18 26.06	2.292	9 11 33.28	147.77	20 52 11.8	753.2	72.06	16 10.1	59 14.6	II. S.
2	L	6 53.09	2.213	9 40 37.47	142.98	18 12 32.6	840.5	70.83	16 10.6	59 16.4	II. S.
2	U	19 19.19	2.140	10 8 46.33	138.59	+15 17 2.6	− 911.8	69.67	16 10.8	59 16.9	II. S.
3	L	7 44.48	2.077	10 36 6.10	134.82	12 8 52.9	967.3	68.66	16 10.5	59 16.0	II. S.
3	U	20 9.09	2.027	11 2 44.97	131.76	8 51 9.1	1007.6	67.83	16 9.9	59 13.6	II. S.
4	L	8 33.18	1.990	11 28 52.37	129.58	5 26 51.5	1033.0	67.21	16 8.7	59 9.4	II. S.
4	U	20 56.91	1.967	11 54 38.29	128.22	+ 1 58 54.9	−1044.0	66.81	16 7.1	59 3.5	II. S.
5	L	9 20.45	1.959	12 20 12.95	127.69	− 1 29 50.1	1041.1	66.64	16 5.0	58 55.7	II. S.
5	U	21 43.97	1.964	12 45 46.27	127.99	4 56 36.3	1024.4	66.69	16 2.4	58 46.0	II. S.
6	L	10 7.62	1.981	13 11 27.72	129.04	8 18 38.4	993.8	66.94	15 59.2	58 34.3	II. S.
6	U	22 31.56	2.010	13 37 25.94	130.77	−11 33 12.6	− 949.6	67.38	15 55.5	58 20.9	II. S.
7	L	10 55.89	2.048	14 3 48.40	133.06	14 37 36.8	892.1	67.97	15 51.3	58 5.6	
7	U	23 20.73	2.093	14 30 41.00	135.76	17 29 12.2	821.6	68.67	15 46.8	57 48.8	
8	L	11 46.13	2.141	14 58 7.59	138.69	20 5 26.2	738.7	69.45	15 41.8	57 30.8	
9	U	0 12.12	2.190	15 26 9.53	141.62	−22 23 54.5	− 644.2	70.19	15 36.6	57 11.6	
9	L	12 38.67	2.234	15 54 45.19	144.28	24 22 27.9	539.8	70.89	15 31.2	56 51.8	
10	U	1 5.71	2.269	16 23 49.84	146.39	25 59 17.1	427.2	71.45	15 25.7	56 31.6	I. N.
10	L	13 33.09	2.292	16 53 15.66	147.75	27 12 58.4	309.0	71.82	15 20.3	56 11.6	I. N.
11	U	2 0.65	2.299	17 22 52.17	148.16	−28 2 39.7	− 187.6	71.96	15 15.0	55 52.1	I. N.
11	L	14 28.19	2.288	17 52 27.23	147.51	28 28 2.7	− 66.4	71.82	15 9.9	55 33.4	I. N.
12	U	2 55.49	2.260	18 21 48.15	145.81	28 29 24.2	+ 52.1	71.44	15 5.1	55 16.1	I. N.
12	L	15 22.36	2.216	18 50 42.99	143.18	28 7 33.3	165.3	70.81	15 0.8	55 0.3	I. S.
13	U	3 48.63	2.160	19 19 1.62	139.82	−27 23 45.0	+ 271.4	69.97	14 57.1	54 46.5	I. S.
13	L	16 14.17	2.096	19 46 36.56	135.95	26 19 33.4	369.0	69.00	14 53.9	54 34.7	I. S.
14	U	4 38.91	2.027	20 13 23.28	131.82	24 56 44.3	457.6	67.94	14 51.3	54 25.4	I. S.
14	L	17 2.82	1.958	20 39 20.20	127.67	23 17 8.0	536.9	66.85	14 49.5	54 18.7	I. S.
15	U	5 25.92	1.892	21 4 28.34	123.72	−21 22 33.1	+ 607.4	65.79	14 48.4	54 14.6	I. S.

AT TRANSIT OF MOON'S CENTER OVER THE MERIDIAN OF WASHINGTON.

Date.	Culmination.	Mean Time of Transit.	Diff. for 1 Hour of Long.	Right Ascension of Center.	Diff. for 1 Hour of Long.	Geocentric Declination of Center.	Diff. for 1 Hour of Long.	Sid. Time of Semid. Passing Meridian.	Geocentric Semidiameter.	Equatorial Horizontal Parallax.	Bright Limbs.
		h m	m	h m s	s	° ′ ″	″	s	′ ″	′ ″	
Nov. 15	L	17 48.27	1.833	21 28 50.93	120.11	−19 14 43.5	+ 669.5	64.80	14 48.0	54 13.3	I. S.
16	U	6 9.93	1.780	21 52 32.88	116.97	16 55 16.3	723.8	63.92	14 48.4	54 14.8	I. S.
16	L	18 31.03	1.737	22 15 40.38	114.39	14 25 41.3	770.9	63.19	14 49.6	54 19.2	I. S.
17	U	6 51.67	1.705	22 38 20.58	112.43	11 47 21.2	811.0	62.61	14 51.6	54 26.2	I. S.
17	L	19 11.99	1.683	23 0 41.28	111.14	− 9 1 33.9	+ 845.4	62.22	14 54.2	54 36.0	I. S.
18	U	7 32.12	1.674	23 22 50.72	110.56	6 9 34.4	873.4	62.04	14 57.6	54 48.3	I. S.
18	L	19 52.21	1.676	23 44 57.56	110.72	3 12 37.5	895.0	62.05	15 1.6	55 3.1	I. S.
19	U	8 12.40	1.692	0 7 10.85	111.64	− 0 12 0.2	910.0	62.29	15 6.2	55 19.9	I. S.
19	L	20 32.86	1.720	0 29 39.99	113.37	+ 2 50 53.8	+ 917.7	62.74	15 11.3	55 38.7	I. S.
20	U	8 53.74	1.762	0 52 34.59	115.89	5 54 31.7	917.1	63.42	15 16.8	55 58.9	I. S.
20	L	21 15.21	1.818	1 16 4.52	119.24	8 57 7.6	907.2	64.33	15 22.6	56 20.3	I. S.
21	U	9 37.44	1.888	1 40 19.81	123.44	11 56 39.6	886.2	65.46	15 28.7	56 42.6	I. S.
21	L	22 0.57	1.971	2 5 30.23	128.42	+14 50 46.3	+ 852.6	66.77	15 34.8	57 5.1	I. S.
22	U	10 24.78	2.066	2 31 44.93	134.13	17 36 44.4	804.4	68.27	15 41.0	57 27.6	I. S.
22	L	22 50.19	2.170	2 59 11.72	140.42	20 11 28.9	740.1	69.89	15 46.9	57 49.5	I. N. S.
23	U	11 16.88	2.280	3 27 56.08	147.01	22 31 34.5	657.8	71.56	15 52.6	58 10.3	I. N. S.
23	L	23 44.90	2.389	3 57 59.87	153.59	+24 33 21.5	+ 556.9	73.20	15 57.8	58 29.5	I. II. N.
24	U	12 14.18	2.490	4 29 20.20	159.66	26 13 6.6	437.6	74.70	16 2.5	58 46.7	II. N.
25	L	0 44.60	2.575	5 1 48.12	164.76	27 27 18.5	301.8	75.95	16 6.7	59 1.8	II. N.
25	U	13 15.88	2.634	5 35 8.52	168.34	28 12 57.3	+ 152.9	76.83	16 10.1	59 14.4	II. N.
26	L	1 47.69	2.662	6 9 0.74	170.00	+28 27 55.7	− 4.0	77.25	16 12.8	59 24.2	II. N.
26	U	14 19.63	2.656	6 43 0.79	169.64	28 11 14.6	162.6	77.19	16 14.7	59 31.2	II. N. S.
27	L	2 51.30	2.617	7 16 44.26	167.30	27 23 10.8	316.6	76.67	16 15.8	59 35.5	II. N. S.
27	U	15 22.33	2.551	7 49 49.53	163.34	26 5 14.1	460.6	75.76	16 16.3	59 37.2	II. S.
28	L	3 52.45	2.467	8 22 0.08	158.27	+24 19 53.9	− 590.1	74.55	16 16.1	59 36.4	II. S.
28	U	16 21.50	2.373	8 53 5.74	152.61	22 10 20.0	702.6	73.19	16 15.3	59 33.5	II. S.
29	L	4 49.39	2.277	9 23 2.53	146.87	19 40 4.4	797.0	71.77	16 14.0	59 28.7	II. S.
29	U	17 16.17	2.187	9 51 51.81	141.42	16 52 43.9	873.4	70.39	16 12.2	59 22.2	II. S.
30	L	5 41.92	2.106	10 19 39.01	136.56	+13 51 50.3	− 932.7	69.14	16 10.1	59 14.3	II. S.
30	U	18 6.76	2.038	10 46 32.28	132.46	10 40 42.7	976.0	68.06	16 7.6	59 5.4	II. S.
Dec. 1	L	6 30.88	1.984	11 12 41.53	129.22	7 22 26.5	1004.4	67.19	16 4.9	58 55.4	II. S.
1	U	18 54.44	1.946	11 38 17.42	126.91	3 59 52.8	1018.9	66.56	16 2.0	58 44.7	II. S.
2	L	7 17.64	1.922	12 3 31.04	125.52	+ 0 35 41.0	−1020.8	66.16	15 58.8	58 33.2	II. S.
2	U	19 40.64	1.911	12 28 33.33	125.02	− 2 47 38.9	1010.4	66.00	15 55.6	58 21.2	II. S.
3	L	8 3.03	1.920	12 53 34.85	125.38	6 7 42.0	988.1	66.07	15 52.2	58 8.7	II. S.
3	U	20 26.77	1.939	13 18 45.50	126.54	9 22 7.3	954.0	66.35	15 48.6	57 55.6	II. S.
4	L	8 50.22	1.970	13 44 14.54	128.41	−12 28 34.5	− 908.4	66.82	15 44.9	57 42.0	II. S.
4	U	21 14.10	2.011	14 10 9.68	130.87	15 24 43.3	851.0	67.44	15 41.1	57 27.9	II. S.
5	L	9 38.53	2.060	14 36 37.31	133.70	18 8 12.9	781.9	68.18	15 37.1	57 13.4	II. S.
5	U	22 3.50	2.112	15 3 41.70	136.96	20 36 43.9	701.3	68.99	15 33.0	56 58.5	II. S.
6	L	10 29.23	2.166	15 31 24.46	140.15	−22 48 0.5	− 609.7	69.79	15 28.9	56 43.2	II. S.
6	U	22 55.52	2.215	15 59 44.44	143.10	24 39 56.7	508.1	70.53	15 24.6	56 27.6	
7	L	11 22.35	2.255	16 28 36.98	145.53	26 10 41.7	398.1	71.14	15 20.4	56 11.9	
7	U	23 49.59	2.282	16 57 54.16	147.17	27 18 46.9	281.9	71.54	15 16.1	55 56.2	
8	L	12 17.06	2.293	17 27 25.26	147.82	−28 3 13.4	− 162.0	71.71	15 11.8	55 40.7	

AT TRANSIT OF MOON'S CENTER OVER THE MERIDIAN OF WASHINGTON.

Date.	Culmination.	Mean Time of Transit.	Diff. for 1 Hour of Long.	Right Ascension of Center.	Diff. for 1 Hour of Long.	Geocentric Declination of Center.	Diff. for 1 Hour of Long.	Sid. Time of Semid. Passing Meridian.	Geocentric Semidiameter.	Equatorial Horizontal Parallax.	Bright Limbs.
		h m	m	h m s	s	° ′ ″	″	s	′ ″	′ ″	
ec. 9	U	0 44.55	2.285	17 56 57.53	147.36	−28 23 35.9	− 41.8	71.61	15 7.7	55 25.6	
9	L	13 11.84	2.259	18 26 17.49	145.77	28 20 5.4	+ 76.1	71.23	15 3.8	55 11.3	I. N.
10	U	1 38.71	2.216	18 55 12.26	143.18	27 53 27.9	189.1	70.60	15 0.1	54 57.7	I. N.
10	L	14 4.98	2.160	19 23 30.86	139.79	27 4 58.2	294.5	69.75	14 56.8	54 45.3	I. N.
11	U	2 30.50	2.094	19 51 4.99	135.83	−25 56 14.0	+ 391.2	68.76	14 53.8	54 34.3	I. S.
11	L	14 55.21	2.023	20 17 49.49	131.56	24 29 6.9	478.3	67.67	14 51.2	54 24.9	I. S.
12	U	3 19.05	1.951	20 43 42.30	127.26	22 45 33.9	555.4	66.56	14 49.2	54 17.4	I. S.
12	L	15 42.05	1.882	21 8 44.22	123.12	20 47 32.4	623.1	65.47	14 47.7	54 11.9	I. S.
13	U	4 4.25	1.819	21 32 58.38	119.32	−18 36 54.2	+ 681.7	64.45	14 46.8	54 8.7	I. S.
13	L	16 25.74	1.764	21 56 29.67	116.00	16 15 23.0	732.1	63.55	14 46.6	54 8.0	I. S.
14	U	4 46.63	1.718	22 19 24.40	113.24	13 44 34.1	774.8	62.80	14 47.1	54 9.7	I. S.
14	L	17 7.02	1.683	22 41 49.83	111.12	11 5 54.3	810.7	62.21	14 48.3	54 14.2	I. S.
15	U	5 27.07	1.659	23 3 53.92	109.68	− 8 20 42.3	+ 840.2	61.81	14 50.2	54 21.3	I. S.
15	L	17 46.89	1.647	23 25 45.16	108.98	5 30 12.1	863.8	61.62	14 52.9	54 31.2	I. S.
16	U	6 6.66	1.649	23 47 32.45	109.04	− 2 35 34.5	881.5	61.63	14 56.4	54 43.9	I. S.
16	L	18 26.51	1.663	0 9 25.12	109.89	+ 0 21 59.2	893.1	61.87	15 0.5	54 59.2	I. S.
17	U	6 46.61	1.690	0 31 32.83	111.56	+ 3 21 14.6	+ 898.3	62.34	15 5.4	55 17.2	I. S.
17	L	19 7.13	1.732	0 54 5.69	114.07	6 20 50.1	896.3	63.04	15 11.0	55 37.5	I. S.
18	U	7 28.24	1.789	1 17 14.14	117.47	9 19 12.5	885.9	63.98	15 17.1	56 0.1	I. S.
18	L	19 50.12	1.860	1 41 8.85	121.79	12 14 33.7	865.9	65.15	15 23.8	56 24.5	I. S.
19	U	8 12.95	1.947	2 6 0.54	126.98	+15 4 46.3	+ 834.1	66.54	15 30.8	56 50.4	I. S.
19	L	20 36.89	2.047	2 31 59.59	133.00	17 47 18.7	788.7	68.12	15 38.2	57 17.4	I. S.
20	U	9 2.12	2.158	2 59 15.32	139.73	20 19 14.4	727.6	69.84	15 45.7	57 44.8	I. S.
20	L	21 28.74	2.278	3 27 54.91	146.92	22 37 10.3	648.5	71.64	15 53.1	58 12.2	I. S.
21	U	9 56.81	2.400	3 58 2.12	154.26	+24 37 21.1	+ 549.9	73.45	16 0.4	58 38.9	I. *N.* S.
21	L	22 26.31	2.516	4 29 35.65	161.22	26 15 48.4	431.3	75.13	16 7.3	59 4.1	I. N. *S.*
22	U	10 57.13	2.616	5 2 27.77	167.25	27 28 36.9	293.8	76.56	16 13.6	59 27.4	I. N.
22	L	23 29.00	2.691	5 36 23.44	171.72	28 12 16.8	+ 140.6	77.61	16 19.2	59 47.9	I. N.
23	U	12 1.56	2.730	6 11 0.86	174.13	+28 24 8.8	− 23.1	78.17	16 23.9	60 5.0	*I.* II. N.
24	L	0 34.38	2.732	6 45 53.49	174.24	28 2 48.2	190.2	78.20	16 27.5	60 18.3	II. N.
24	U	13 6.98	2.696	7 20 33.60	172.08	27 8 18.7	353.3	77.71	16 30.0	60 27.5	II. N.
25	L	1 38.96	2.629	7 54 35.94	168.01	25 42 12.0	505.3	76.77	16 31.3	60 32.4	II. N. *S.*
25	U	14 9.99	2.539	8 27 40.93	162.62	+23 47 15.1	− 641.0	75.50	16 31.6	60 33.0	II. S.
26	L	2 39.86	2.437	8 59 36.07	156.49	21 27 7.9	756.7	74.04	16 30.6	60 29.5	II. S.
26	U	15 8.48	2.333	9 30 16.24	150.21	18 45 58.8	851.1	72.51	16 28.6	60 22.2	II. S.
27	L	3 35.87	2.234	9 59 42.41	144.24	15 48 3.5	924.5	71.03	16 25.7	60 11.6	II. S.
27	U	16 2.12	2.144	10 28 0.24	138.87	+12 37 29.3	− 977.9	69.68	16 22.0	59 58.2	II. S.
28	L	4 27.38	2.069	10 55 18.44	134.32	9 18 6.7	1012.9	68.52	16 17.8	59 42.5	II. S.
28	U	16 51.83	2.008	11 21 47.55	130.70	5 53 24.1	1031.5	67.57	16 13.0	59 24.9	II. S.
29	L	5 15.65	1.964	11 47 38.95	128.04	+ 2 26 28.7	1035.3	66.88	16 7.9	59 6.2	II. S.
29	U	17 39.04	1.936	12 13 4.26	126.35	− 0 59 51.7	−1025.9	66.43	16 2.5	58 46.6	II. S.
30	L	6 2.18	1.924	12 38 14.90	125.60	4 23 5.5	1004.4	66.23	15 57.1	58 26.7	II. S.
30	U	18 25.26	1.926	13 3 21.72	125.70	7 40 52.9	971.6	66.25	15 51.6	58 6.7	II. S.
31	L	6 48.44	1.941	13 28 34.89	126.63	10 51 3.3	928.2	66.49	15 46.2	57 46.9	II. S.
31	U	19 11.88	1.968	13 54 3.55	128.26	−13 51 30.8	− 874.7	66.92	15 41.0	57 27.6	II. S.

FOR TRANSIT AT WASHINGTON.

Date.	Mean Time of Transit.	Apparent Right Ascension.	Apparent Declination.	Hor. Par.	Semidiam.	S.T. of Sem. Pass. Mer.
	h m	h m s	° ′ ″	″	″	s
Jan. 0	23 0	17 39 24.46	−20 11 14.3	12.0	4.6	0.33
1	22 54	17 37 20.49	20 11 23.5	11.7	4.5	0.32
2	22 48	17 35 59.37	20 13 29.9	11.4	4.4	0.31
3	22 44	17 35 19.60	20 17 22.8	11.1	4.3	0.30
4	22 40	17 35 18.94	20 22 49.8	10.8	4.2	0.29
5	22 37	17 35 54.81	−20 29 37.2	10.6	4.1	0.29
6	22 34	17 37 4.45	20 37 31.1	10.4	4.0	0.28
7	22 31	17 38 45.09	20 46 17.7	10.2	3.9	0.27
8	22 29	17 40 53.99	20 55 43.9	9.9	3.8	0.27
9	22 28	17 43 28.55	21 5 37.2	9.7	3.7	0.26
10	22 27	17 46 26.36	−21 15 46.1	9.5	3.6	0.26
11	22 27	17 49 45.20	21 26 0.3	9.3	3.5	0.25
12	22 26	17 53 23.04	21 36 10.2	9.1	3.4	0.25
13	22 26	17 57 18.04	21 46 7.1	8.9	3.4	0.24
14	22 27	18 1 28.53	21 55 43.2	8.7	3.3	0.24
15	22 27	18 5 53.03	−22 4 51.9	8.6	3.3	0.23
16	22 28	18 10 30.22	22 13 27.1	8.5	3.2	0.23
17	22 29	18 15 18.90	22 21 23.1	8.3	3.2	0.23
18	22 30	18 20 17.99	22 28 35.1	8.2	3.1	0.22
19	22 31	18 25 26.53	22 34 59.0	8.0	3.0	0.22
20	22 32	18 30 43.66	−22 40 30.9	7.9	3.0	0.22
21	22 33	18 36 8.61	22 45 7.3	7.8	3.0	0.21
22	22 35	18 41 40.70	22 48 45.2	7.7	2.9	0.21
23	22 37	18 47 19.30	22 51 21.8	7.6	2.9	0.21
24	22 39	18 53 3.85	22 52 54.7	7.5	2.9	0.21
25	22 41	18 58 53.84	−22 53 21.9	7.4	2.8	0.20
26	22 43	19 4 48.80	22 52 41.5	7.4	2.8	0.20
27	22 45	19 10 48.31	22 50 51.6	7.3	2.8	0.20
28	22 47	19 16 52.01	22 47 50.6	7.2	2.7	0.20
29	22 49	19 22 59.56	22 43 37.2	7.1	2.7	0.20
30	22 51	19 29 10.64	−22 38 10.0	7.1	2.7	0.19
31	22 53	19 35 24.96	22 31 28.0	7.0	2.7	0.19
Feb. 1	22 56	19 41 42.27	22 23 30.0	6.9	2.6	0.19
2	22 58	19 48 2.33	22 14 15.1	6.9	2.6	0.19
3	23 1	19 54 24.94	22 3 42.4	6.8	2.6	0.19
4	23 3	20 0 49.90	−21 51 51.1	6.8	2.6	0.19
5	23 5	20 7 17.01	21 38 40.5	6.7	2.6	0.18
6	23 8	20 13 46.12	21 24 9.9	6.7	2.5	0.18
7	23 10	20 20 17.08	21 8 18.9	6.7	2.5	0.18
8	23 13	20 26 49.75	20 51 6.8	6.6	2.5	0.18
9	23 16	20 33 24.02	−20 32 33.0	6.6	2.5	0.18
10	23 18	20 39 59.78	20 12 37.2	6.6	2.5	0.18
11	23 21	20 46 36.93	19 51 19.0	6.5	2.5	0.18
12	23 24	20 53 15.39	19 28 38.1	6.5	2.5	0.18
13	23 27	20 59 55.10	19 4 34.3	6.5	2.5	0.18
14	23 29	21 6 35.98	−18 39 7.1	6.4	2.4	0.17
15	23 32	21 13 17.99	−18 12 16.4	6.4	2.4	0.17
Date.	Mean Time of Transit.	Apparent Right Ascension.	Apparent Declination.	Hor. Par.		
	h m	h m s	° ′ ″	″		
Feb. 15	23 32	21 13 17.99	−18 12 16.4	6.4		
16	23 35	21 20 1.08	17 44 2.1	6.4		
17	23 38	21 26 45.24	17 14 23.9	6.4		
18	23 40	21 33 30.44	16 43 21.8	6.4		
19	23 43	21 40 16.67	16 10 55.9	6.4		
20	23 46	21 47 3.91	−15 37 6.1	6.4		
21	23 49	21 53 52.17	15 1 52.5	6.4		
22	23 52	22 0 41.46	14 25 15.5	6.4		
23	23 55	22 7 31.78	13 47 15.3	6.4		
24	23 58	22 14 23.14	13 7 52.3	6.4		
26	0 0	22 21 15.55	−12 27 7.1	6.4		
27	0 3	22 28 9.02	11 45 0.4	6.4		
28	0 6	22 35 3.54	11 1 33.3	6.4		
29	0 9	22 41 59.09	10 16 46.9	6.4		
Mar. 1	0 12	22 48 55.64	9 30 42.9	6.4		
2	0 15	22 55 53.16	− 8 43 23.0	6.5		
3	0 18	23 2 51.56	7 54 49.5	6.5		
4	0 21	23 9 50.73	7 5 5.4	6.5		
5	0 24	23 16 50.52	6 14 14.0	6.5		
6	0 27	23 23 50.73	5 22 19.4	6.6		
7	0 31	23 30 51.09	− 4 29 26.2	6.6		
8	0 34	23 37 51.24	3 35 40.3	6.7		
9	0 37	23 44 50.76	2 41 8.4	6.7		
10	0 40	23 51 49.15	1 45 58.4	6.8		
11	0 43	23 58 45.77	− 0 50 19.0	6.9		
12	0 46	0 5 39.89	+ 0 5 40.0	7.0		
13	0 48	0 12 30.63	1 1 47.0	7.1		
14	0 51	0 19 17.01	1 57 49.7	7.2		
15	0 54	0 25 57.93	2 53 34.5	7.3		
16	0 57	0 32 32.17	3 48 47.0	7.5		
17	0 59	0 38 58.38	+ 4 43 11.9	7.6		
18	1 2	0 45 15.14	5 36 33.4	7.8		
19	1 4	0 51 20.96	6 28 35.6	7.9		
20	1 6	0 57 14.31	7 19 2.5	8.1		
21	1 7	1 2 53.63	8 7 38.2	8.3		
22	1 9	1 8 17.39	+ 8 54 7.8	8.5		
23	1 10	1 13 24.09	9 38 17.3	8.7		
24	1 11	1 18 12.31	10 19 53.3	9.0		
25	1 11	1 22 40.70	10 58 43.5	9.2		
26	1 12	1 26 48.02	11 34 37.3	9.5		
27	1 11	1 30 33.16	+12 7 24.8	9.8		
28	1 11	1 33 55.14	12 36 57.5	10.1		
29	1 10	1 36 53.13	13 3 7.7	10.4		
30	1 8	1 39 26.45	13 25 48.7	10.7		
31	1 7	1 41 34.61	13 44 54.9	11.0		
Apr. 1	1 4	1 43 17.33	+14 0 21.6	11.3		
2	1 2	1 44 34.50	+14 12 4.9	11.7		

MERCURY, 1912.

FOR TRANSIT AT WASHINGTON.

.	Mean Time of Transit.	Apparent Right Ascension.	Apparent Declination.	Hor. Par.	Semidiam.	S.T. of Sem. Pass. Mer.	Date.	Mean Time of Transit.	Apparent Right Ascension.	Apparent Declination.	Hor. Par.	Semidiam.	S.T. of Sem. Pass. Mer.
	h m	h m s	° ′ ″	″	″	s		h m	h m s	° ′ ″	″	″	s
1	1 4	1 43 17.33	+14 0 21.6	11.3	4.3	0.30	May 16	22 20	1 59 47.89	+ 8 46 50.4	9.8	3.7	0.25
2	1 2	1 44 34.50	14 12 4.9	11.7	4.4	0.31	17	22 20	2 4 18.16	9 13 29.8	9.6	3.7	0.25
3	0 59	1 45 26.26	14 20 2.3	12.0	4.6	0.31	18	22 21	2 8 58.63	9 41 22.4	9.5	3.6	0.24
4	0 55	1 45 53.02	14 24 12.6	12.4	4.7	0.32	19	22 22	2 13 49.26	10 10 23.7	9.3	3.5	0.24
5	0 51	1 45 55.45	14 24 35.9	12.7	4.8	0.33	20	22 23	2 18 50.06	10 40 29.1	9.1	3.5	0.23
6	0 47	1 45 34.50	+14 21 14.1	13.0	4.9	0.34	21	22 24	2 24 1.05	+11 11 33.8	9.0	3.4	0.23
7	0 42	1 44 51.43	14 14 11.3	13.4	5.1	0.35	22	22 26	2 29 22.31	11 43 33.3	8.8	3.3	0.23
8	0 37	1 43 47.80	14 3 33.8	13.7	5.2	0.36	23	22 27	2 34 53.95	12 16 22.7	8.6	3.3	0.22
9	0 32	1 42 25.47	13 49 30.7	14.0	5.3	0.36	24	22 29	2 40 36.11	12 49 57.2	8.5	3.2	0.22
10	0 27	1 40 46.60	13 32 13.9	14.3	5.4	0.37	25	22 31	2 46 28.94	13 24 11.8	8.4	3.2	0.22
11	0 21	1 38 53.59	+13 11 58.3	14.5	5.5	0.38	26	22 33	2 52 32.65	+13 59 1.0	8.2	3.1	0.21
12	0 15	1 36 49.05	12 49 1.8	14.7	5.6	0.38	27	22 35	2 58 47.45	14 34 19.0	8.1	3.1	0.21
13	0 8	1 34 35.79	12 23 45.0	14.9	5.7	0.39	28	22 38	3 5 13.58	15 9 59.9	8.0	3.0	0.21
14	0 2	1 32 16.69	11 56 31.1	15.1	5.7	0.39	29	22 41	3 11 51.26	15 45 57.6	7.8	3.0	0.21
14	23 56	1 29 54.65	11 27 45.3	15.2	5.8	0.39	30	22 44	3 18 40.74	16 22 5.2	7.7	2.9	0.20
15	23 50	1 27 32.54	+10 57 54.1	15.3	5.8	0.39	31	22 47	3 25 42.24	+16 58 15.3	7.6	2.9	0.20
16	23 44	1 25 13.14	10 27 24.7	15.4	5.8	0.40	June 1	22 50	3 32 55.98	17 34 20.0	7.5	2.8	0.20
17	23 37	1 22 59.05	9 56 44.3	15.4	5.8	0.40	2	22 53	3 40 22.14	18 10 10.7	7.4	2.8	0.20
18	23 31	1 20 52.66	9 26 19.3	15.4	5.8	0.40	3	22 57	3 48 0.84	18 45 38.2	7.3	2.8	0.20
19	23 25	1 18 56.08	8 56 34.8	15.3	5.8	0.39	4	23 1	3 55 52.14	19 20 32.9	7.2	2.7	0.19
20	23 20	1 17 11.16	+ 8 27 53.7	15.2	5.8	0.39	5	23 5	4 3 56.01	+19 54 44.2	7.1	2.7	0.19
21	23 14	1 15 39.46	8 0 36.5	15.1	5.7	0.39	6	23 9	4 12 12.33	20 28 0.9	7.0	2.7	0.19
22	23 9	1 14 22.23	7 35 1.3	15.0	5.7	0.38	7	23 14	4 20 40.81	21 0 11.3	7.0	2.6	0.19
23	23 4	1 13 20.46	7 11 23.2	14.9	5.6	0.38	8	23 19	4 29 21.06	21 31 3.2	6.9	2.6	0.19
24	22 59	1 12 34.87	6 49 54.4	14.7	5.6	0.37	9	23 24	4 38 12.51	22 0 24.3	6.8	2.6	0.19
25	22 55	1 12 5.90	+ 6 30 44.7	14.5	5.5	0.37	10	23 29	4 47 14.40	+22 28 2.1	6.8	2.6	0.19
26	22 51	1 11 53.82	6 14 1.2	14.3	5.4	0.36	11	23 34	4 56 25.80	22 53 44.5	6.7	2.6	0.18
27	22 47	1 11 58.72	5 59 48.7	14.1	5.3	0.36	12	23 39	5 5 45.60	23 17 19.7	6.7	2.6	0.18
28	22 43	1 12 20.52	5 48 10.0	13.8	5.2	0.35	13	23 45	5 15 12.52	23 38 36.8	6.7	2.5	0.18
29	22 40	1 12 59.02	5 39 5.9	13.6	5.2	0.35	14	23 50	5 24 45.14	23 57 26.1	6.7	2.5	0.18
30	22 37	1 13 53.91	+ 5 32 36.1	13.4	5.1	0.34	15	23 56	5 34 21.92	+24 13 39.3	6.6	2.5	0.18
1	22 34	1 15 4.81	5 28 38.9	13.1	5.0	0.33	17	0 2	5 44 1.23	24 27 9.6	6.6	2.5	0.18
2	22 32	1 16 31.31	5 27 11.5	12.9	4.9	0.33	18	0 7	5 53 41.40	24 37 52.1	6.6	2.5	0.19
3	22 30	1 18 12.94	5 28 10.4	12.7	4.8	0.32	19	0 13	6 3 20.79	24 45 44.2	6.6	2.5	0.19
4	22 28	1 20 9.20	5 31 31.6	12.4	4.7	0.32	20	0 19	6 12 57.79	24 50 45.0	6.7	2.5	0.19
5	22 26	1 22 19.62	+ 5 37 10.6	12.2	4.6	0.31	21	0 24	6 22 30.88	+24 52 55.1	6.7	2.5	0.19
6	22 24	1 24 43.72	5 45 2.5	12.0	4.5	0.30	22	0 30	6 31 58.66	24 52 17.0	6.7	2.5	0.19
7	22 23	1 27 21.03	5 55 2.3	11.7	4.4	0.30	23	0 35	6 41 19.85	24 48 54.6	6.7	2.6	0.19
8	22 22	1 30 11.09	6 7 4.9	11.5	4.4	0.29	24	0 40	6 50 33.31	24 42 53.3	6.8	2.6	0.19
9	22 21	1 33 13.50	6 21 5.1	11.3	4.3	0.29	25	0 45	6 59 38.08	24 34 19.4	6.8	2.6	0.19
10	22 20	1 36 27.86	+ 6 36 57.7	11.0	4.2	0.28	26	0 50	7 8 33.33	+24 23 19.9	6.9	2.6	0.19
11	22 20	1 39 53.82	6 54 37.5	10.8	4.1	0.28	27	0 55	7 17 18.39	24 10 2.3	6.9	2.6	0.19
12	22 19	1 43 31.07	7 13 59.5	10.6	4.0	0.27	28	1 0	7 25 52.71	23 54 34.6	7.0	2.7	0.19
13	22 19	1 47 19.31	7 34 58.6	10.4	4.0	0.26	29	1 4	7 34 15.88	23 37 5.0	7.1	2.7	0.20
14	22 19	1 51 18.32	7 57 30.1	10.2	3.9	0.26	30	1 9	7 42 27.59	23 17 42.0	7.1	2.7	0.20
15	22 20	1 55 27.90	+ 8 21 29.0	10.0	3.8	0.26	July 1	1 13	7 50 27.61	+22 56 33.6	7.2	2.7	0.20
16	22 20	1 59 47.89	+ 8 46 50.4	9.8	3.7	0.25	2	1 17	7 58 15.82	+22 33 47.9	7.3	2.8	0.20

MERCURY, 1912.

FOR TRANSIT AT WASHINGTON.

Date.	Mean Time of Transit.	Apparent Right Ascension.	Apparent Declination.	Hor. Par.	Semidiam.	S.T. of Sem. Pass. Mer.	Date.	Mean Time of Transit.	Apparent Right Ascension.	Apparent Declination.	Hor. Par.
	h m	h m s	° ′ ″	″	″	s		h m	h m s	° ′ ″	″
July 1	1 13	7 50 27.61	+22 56 33.6	7.2	2.7	0.20	Aug. 16	0 36	10 15 9.01	+ 5 46 6.9	14.3
2	1 17	7 58 15.82	22 33 47.9	7.3	2.8	0.20	17	0 30	10 12 23.83	6 1 36.7	14.3
3	1 20	8 5 52.14	22 9 32.7	7.4	2.8	0.20	18	0 23	10 9 28.18	6 19 51.7	14.4
4	1 24	8 13 16.57	21 43 55.7	7.5	2.8	0.20	19	0 16	10 6 24.82	6 40 39.5	14.4
5	1 27	8 20 29.12	21 17 4.4	7.6	2.9	0.21	20	0 9	10 3 16.92	7 3 43.7	14.3
6	1 30	8 27 29.85	+20 49 5.9	7.6	2.9	0.21	21	0 2	10 0 7.94	+ 7 28 44.3	14.2
7	1 33	8 34 18.85	20 20 6.9	7.7	2.9	0.21	21	23 55	9 57 1.57	7 55 18.3	14.1
8	1 36	8 40 56.21	19 50 14.1	7.8	3.0	0.21	22	23 48	9 54 1.70	8 22 59.8	14.0
9	1 38	8 47 22.04	19 19 33.7	8.0	3.0	0.21	23	23 41	9 51 12.26	8 51 21.1	13.8
10	1 40	8 53 36.44	18 48 11.8	8.1	3.1	0.22	24	23 34	9 48 37.10	9 19 53.7	13.6
11	1 42	8 59 39.50	+18 16 14.4	8.2	3.1	0.22	25	23 28	9 46 19.90	+ 9 48 8.9	13.3
12	1 44	9 5 31.32	17 43 47.0	8.3	3.1	0.22	26	23 22	9 44 24.08	10 15 38.0	13.0
13	1 46	9 11 11.98	17 10 55.2	8.4	3.2	0.22	27	23 17	9 42 52.69	10 41 53.8	12.8
14	1 48	9 16 41.53	16 37 44.4	8.5	3.2	0.23	28	23 12	9 41 48.37	11 6 30.9	12.5
15	1 49	9 22 0.04	16 4 19.8	8.7	3.3	0.23	29	23 7	9 41 13.28	11 29 6.1	12.2
16	1 50	9 27 7.52	+15 30 46.4	8.8	3.3	0.23	30	23 3	9 41 9.09	+11 49 18.3	11.8
17	1 51	9 32 3.97	14 57 9.3	8.9	3.4	0.23	31	23 0	9 41 36.96	12 6 49.2	11.5
18	1 52	9 36 49.36	14 23 33.7	9.1	3.4	0.24	Sept. 1	22 57	9 42 37.54	12 21 22.8	11.2
19	1 53	9 41 23.62	13 50 4.4	9.2	3.5	0.24	2	22 55	9 44 11.04	12 32 45.7	10.8
20	1 53	9 45 46.68	13 16 46.4	9.4	3.6	0.24	3	22 53	9 46 17.17	12 40 47.0	10.5
21	1 53	9 49 58.42	+12 43 44.9	9.5	3.6	0.25	4	22 51	9 48 55.23	+12 45 18.1	10.2
22	1 53	9 53 58.70	12 11 5.1	9.7	3.7	0.25	5	22 51	9 52 4.12	12 46 13.1	9.9
23	1 53	9 57 47.32	11 38 52.1	9.8	3.7	0.25	6	22 50	9 55 42.41	12 43 28.2	9.6
24	1 53	10 1 24.07	11 7 11.1	10.0	3.8	0.26	7	22 50	9 59 48.38	12 37 2.0	9.3
25	1 52	10 4 48.69	10 36 7.7	10.2	3.9	0.26	8	22 51	10 4 20.02	12 26 55.6	9.0
26	1 52	10 8 0.88	+10 5 47.5	10.4	3.9	0.27	9	22 52	10 9 15.13	+12 13 12.3	8.8
27	1 51	10 11 0.31	9 36 16.5	10.6	4.0	0.27	10	22 53	10 14 31.39	11 55 57.9	8.5
28	1 50	10 13 46.62	9 7 40.9	10.7	4.1	0.27	11	22 55	10 20 6.38	11 35 20.2	8.3
29	1 48	10 16 19.39	8 40 7.0	10.9	4.1	0.28	12	22 57	10 25 57.67	11 11 29.0	8.1
30	1 46	10 18 38.18	8 13 41.7	11.1	4.2	0.28	13	22 59	10 32 2.85	10 44 35.3	7.9
31	1 44	10 20 42.51	+ 7 48 31.9	11.3	4.3	0.29	14	23 1	10 38 19.60	+10 14 51.8	7.7
Aug. 1	1 42	10 22 31.88	7 24 44.9	11.5	4.4	0.29	15	23 4	10 44 45.75	9 42 32.4	7.6
2	1 40	10 24 5.76	7 2 28.5	11.7	4.4	0.30	16	23 6	10 51 19.28	9 7 51.0	7.4
3	1 37	10 25 23.60	6 41 50.6	11.9	4.5	0.30	17	23 9	10 57 58.35	8 31 2.0	7.3
4	1 34	10 26 24.84	6 22 59.8	12.1	4.6	0.31	18	23 12	11 4 41.33	7 52 19.8	7.2
5	1 31	10 27 8.95	+ 6 6 4.7	12.4	4.7	0.31	19	23 15	11 11 26.81	+ 7 11 58.2	7.1
6	1 28	10 27 35.41	5 51 14.0	12.6	4.8	0.32	20	23 18	11 18 13.57	6 30 10.8	7.0
7	1 24	10 27 43.76	5 38 36.7	12.8	4.8	0.32	21	23 20	11 25 0.59	5 47 10.4	6.9
8	1 20	10 27 33.61	5 28 21.6	13.0	4.9	0.33	22	23 23	11 31 47.04	5 3 8.7	6.8
9	1 16	10 27 4.64	5 20 37.4	13.2	5.0	0.33	23	23 26	11 38 32.25	4 18 16.5	6.7
10	1 11	10 26 16.69	+ 5 15 32.3	13.4	5.1	0.34	24	23 29	11 45 15.69	+ 3 32 44.0	6.6
11	1 6	10 25 9.79	5 13 13.9	13.6	5.1	0.34	25	23 32	11 51 56.95	2 46 40.2	6.6
12	1 1	10 23 44.17	5 13 48.7	13.7	5.2	0.35	26	23 34	11 58 35.75	2 0 13.3	6.5
13	0 55	10 22 0.31	5 17 21.6	13.9	5.3	0.35	27	23 37	12 5 11.89	1 13 30.8	6.5
14	0 49	10 19 59.00	5 23 55.6	14.0	5.3	0.35	28	23 39	12 11 45.25	+ 0 26 39.4	6.4
15	0 43	10 17 41.39	+ 5 33 31.4	14.2	5.4	0.36	29	23 42	12 18 15.78	− 0 20 15.1	6.4
16	0 36	10 15 9.01	+ 5 46 6.9	14.3	5.4	0.36	30	23 44	12 24 43.48	− 1 7 7.3	6.3

FOR TRANSIT AT WASHINGTON.

Date.	Mean Time of Transit.	Apparent Right Ascension.	Apparent Declination.	Hor. Par.	Semidiam.	S.T. of Sem. Pass. Mer.
	h m	h m s	° ′ ″	″	″	s
ct. 1	23 47	12 31 8.38	− 1 53 52.5	6.3	2.4	0.16
2	23 49	12 37 30.55	2 40 26.5	6.3	2.4	0.16
3	23 52	12 43 50.11	3 26 45.6	6.3	2.4	0.16
4	23 54	12 50 7.17	4 12 46.5	6.2	2.4	0.16
5	23 56	12 56 21.86	4 58 25.9	6.2	2.4	0.16
6	23 59	13 2 34.33	− 5 43 41.2	6.2	2.4	0.16
8	0 1	13 8 44.73	6 28 30.1	6.2	2.4	0.16
9	0 3	13 14 53.22	7 12 50.1	6.2	2.4	0.16
10	0 5	13 20 59.96	7 56 39.2	6.2	2.4	0.16
11	0 7	13 27 5.10	8 39 55.7	6.2	2.4	0.16
12	0 10	13 33 8.81	− 9 22 37.7	6.2	2.4	0.16
13	0 12	13 39 11.24	10 4 43.6	6.2	2.4	0.16
14	0 14	13 45 12.54	10 46 12.0	6.2	2.4	0.16
15	0 16	13 51 12.85	11 27 1.4	6.2	2.4	0.16
16	0 18	13 57 12.31	12 7 10.4	6.2	2.4	0.16
17	0 20	14 3 11.05	−12 46 37.6	6.2	2.4	0.16
18	0 22	14 9 9.19	13 25 21.9	6.2	2.4	0.16
19	0 24	14 15 6.86	14 3 22.1	6.3	2.4	0.16
20	0 26	14 21 4.16	14 40 36.7	6.3	2.4	0.16
21	0 28	14 27 1.18	15 17 4.7	6.3	2.4	0.16
22	0 30	14 32 58.01	−15 52 44.9	6.3	2.4	0.17
23	0 32	14 38 54.71	16 27 36.1	6.4	2.4	0.17
24	0 34	14 44 51.35	17 1 37.0	6.4	2.4	0.17
25	0 36	14 50 47.98	17 34 46.3	6.4	2.4	0.17
26	0 38	14 56 44.64	18 7 2.8	6.5	2.5	0.17
27	0 40	15 2 41.33	−18 38 25.3	6.5	2.5	0.17
28	0 42	15 8 38.05	19 8 52.4	6.5	2.5	0.17
29	0 44	15 14 34.77	19 38 22.7	6.6	2.5	0.18
30	0 46	15 20 31.46	20 6 54.9	6.6	2.5	0.18
31	0 48	15 26 28.03	20 34 27.7	6.7	2.5	0.18
ov. 1	0 50	15 32 24.38	−21 0 59.5	6.7	2.6	0.18
2	0 52	15 38 20.39	21 26 28.7	6.8	2.6	0.18
3	0 54	15 44 15.89	21 50 53.9	6.9	2.6	0.19
4	0 56	15 50 10.68	22 14 13.4	6.9	2.6	0.19
5	0 58	15 56 4.52	22 36 25.6	7.0	2.7	0.19
6	1 0	16 1 57.11	−22 57 28.8	7.1	2.7	0.19
7	1 2	16 7 48.10	23 17 21.3	7.2	2.7	0.20
8	1 3	16 13 37.08	23 36 1.4	7.2	2.7	0.20
9	1 5	16 19 23.59	23 53 27.3	7.3	2.8	0.20
10	1 7	16 25 7.06	24 9 37.1	7.4	2.8	0.21
11	1 9	16 30 46.87	−24 24 29.2	7.5	2.9	0.21
12	1 10	16 36 22.31	24 38 1.7	7.7	2.9	0.21
13	1 12	16 41 52.55	24 50 12.8	7.8	3.0	0.22
14	1 13	16 47 16.63	25 1 0.7	7.9	3.0	0.22
15	1 15	16 52 33.46	25 10 23.7	8.0	3.1	0.22
16	1 16	16 57 41.83	−25 18 20.0	8.2	3.1	0.23
17	1 17	17 2 40.35	−25 24 47.9	8.3	3.2	0.23
Nov. 17	1 17	17 2 40.35	−25 24 47.9	8.3	3.2	0.23
18	1 18	17 7 27.42	25 29 45.8	8.5	3.2	0.24
19	1 18	17 12 1.27	25 33 12.0	8.7	3.3	0.24
20	1 19	17 16 19.92	25 35 4.9	8.9	3.4	0.25
21	1 19	17 20 21.13	25 35 23.0	9.1	3.4	0.25
22	1 19	17 24 2.41	−25 34 4.8	9.3	3.5	0.26
23	1 18	17 27 21.02	25 31 8.5	9.5	3.6	0.27
24	1 17	17 30 13.99	25 26 32.6	9.7	3.7	0.27
25	1 15	17 32 38.13	25 20 15.5	10.0	3.8	0.28
26	1 13	17 34 30.07	25 12 15.1	10.3	3.9	0.29
27	1 11	17 35 46.38	−25 2 29.3	10.5	4.0	0.29
28	1 7	17 36 23.63	24 50 55.7	10.8	4.1	0.30
29	1 3	17 36 18.65	24 37 32.1	11.1	4.2	0.31
30	0 58	17 35 28.75	24 22 16.2	11.4	4.3	0.32
Dec. 1	0 53	17 33 52.03	24 5 6.3	11.7	4.4	0.32
2	0 47	17 31 27.75	−23 46 1.9	12.0	4.5	0.33
3	0 40	17 28 16.71	23 25 5.5	12.2	4.6	0.34
4	0 32	17 24 21.60	23 2 23.5	12.5	4.7	0.34
5	0 23	17 19 47.25	22 38 7.7	12.7	4.8	0.35
6	0 14	17 14 40.72	22 12 36.7	12.9	4.9	0.35
7	0 5	17 9 11.05	−21 46 17.1	13.0	4.9	0.35
7	23 55	17 3 28.81	21 19 42.9	13.0	4.9	0.35
8	23 45	16 57 45.36	20 53 34.1	13.0	4.9	0.35
9	23 36	16 52 12.10	20 28 34.0	12.9	4.9	0.35
10	23 27	16 46 59.52	20 5 25.0	12.8	4.8	0.34
11	23 18	16 42 16.52	−19 44 44.9	12.6	4.8	0.34
12	23 10	16 38 10.04	19 27 4.2	12.3	4.7	0.33
13	23 3	16 34 44.84	19 12 43.8	12.1	4.6	0.32
14	22 56	16 32 3.63	19 1 54.9	11.8	4.5	0.32
15	22 50	16 30 7.30	18 54 39.3	11.5	4.4	0.31
16	22 45	16 28 55.31	−18 50 51.0	11.2	4.3	0.30
17	22 41	16 28 26.02	18 50 17.7	11.0	4.2	0.29
18	22 37	16 28 37.06	18 52 43.0	10.7	4.0	0.29
19	22 34	16 29 25.63	18 57 47.8	10.4	3.9	0.28
20	22 32	16 30 48.74	19 5 11.9	10.1	3.8	0.27
21	22 30	16 32 43.37	−19 14 35.0	9.9	3.7	0.26
22	22 28	16 35 6.57	19 25 37.5	9.6	3.6	0.26
23	22 27	16 37 55.57	19 38 0.8	9.4	3.6	0.25
24	22 26	16 41 7.81	19 51 27.6	9.2	3.5	0.25
25	22 26	16 44 40.94	20 5 42.1	9.0	3.4	0.24
26	22 26	16 48 32.83	−20 20 29.9	8.8	3.3	0.24
27	22 26	16 52 41.56	20 35 38.1	8.6	3.3	0.23
28	22 26	16 57 5.43	20 50 55.3	8.4	3.2	0.23
29	22 27	17 1 42.93	21 6 11.4	8.3	3.1	0.22
30	22 28	17 6 32.72	21 21 17.1	8.1	3.1	0.22
31	22 29	17 11 33.60	−21 36 4.4	8.0	3.0	0.22
32	22 30	17 16 44.53	−21 50 26.8	7.9	3.0	0.21

VENUS, 1912.

FOR TRANSIT AT WASHINGTON.

Date.	Mean Time of Transit.	Apparent Right Ascension.	Apparent Declination.	Hor. Par.	Semidiam.	S.T. of Sem. Pass. Mer.
	h m	h m s	° ′ ″	″	″	s
Jan. 1	21 0	15 43 3.85	−17 7 13.8	9.2	8.9	0.62
2	21 0	15 47 49.01	17 23 56.2	9.1	8.8	0.62
3	21 1	15 52 35.53	17 40 17.0	9.0	8.8	0.61
4	21 2	15 57 23.40	17 56 15.4	9.0	8.7	0.61
5	21 3	16 2 12.60	18 11 50.6	8.9	8.7	0.61
6	21 4	16 7 3.14	−18 27 1.8	8.9	8.6	0.60
7	21 5	16 11 55.00	18 41 48.1	8.8	8.5	0.60
8	21 6	16 16 48.15	18 56 8.9	8.7	8.5	0.60
9	21 7	16 21 42.58	19 10 3.3	8.7	8.4	0.59
10	21 8	16 26 38.25	19 23 30.6	8.6	8.4	0.59
11	21 9	16 31 35.14	−19 36 30.1	8.5	8.3	0.59
12	21 10	16 36 33.22	19 49 1.0	8.5	8.2	0.58
13	21 11	16 41 32.46	20 1 2.6	8.4	8.2	0.58
14	21 12	16 46 32.82	20 12 34.2	8.4	8.1	0.58
15	21 13	16 51 34.28	20 23 35.4	8.3	8.1	0.57
16	21 14	16 56 36.80	−20 34 5.4	8.3	8.0	0.57
17	21 15	17 1 40.34	20 44 3.4	8.2	8.0	0.57
18	21 16	17 6 44.85	20 53 28.9	8.2	7.9	0.57
19	21 17	17 11 50.29	21 2 21.4	8.1	7.9	0.56
20	21 18	17 16 56.64	21 10 40.4	8.1	7.8	0.56
21	21 20	17 22 3.84	−21 18 25.5	8.0	7.8	0.56
22	21 21	17 27 11.85	21 25 36.1	8.0	7.7	0.55
23	21 22	17 32 20.62	21 32 11.7	7.9	7.7	0.55
24	21 23	17 37 30.11	21 38 11.9	7.9	7.6	0.55
25	21 24	17 42 40.26	21 43 36.3	7.8	7.6	0.55
26	21 26	17 47 51.03	−21 48 24.5	7.8	7.6	0.54
27	21 27	17 53 2.37	21 52 36.2	7.7	7.5	0.54
28	21 28	17 58 14.25	21 56 11.0	7.7	7.5	0.54
29	21 30	18 3 26.60	21 59 8.7	7.6	7.4	0.53
30	21 31	18 8 39.38	22 1 29.0	7.6	7.4	0.53
31	21 32	18 13 52.53	−22 3 11.7	7.6	7.3	0.53
Feb. 1	21 33	18 19 6.00	22 4 16.6	7.5	7.3	0.53
2	21 35	18 24 19.75	22 4 43.4	7.5	7.3	0.52
3	21 36	18 29 33.74	22 4 32.1	7.5	7.2	0.52
4	21 37	18 34 47.90	22 3 42.4	7.4	7.2	0.52
5	21 38	18 40 2.18	−22 2 14.2	7.4	7.2	0.51
6	21 40	18 45 16.53	22 0 7.5	7.3	7.1	0.51
7	21 41	18 50 30.88	21 57 22.3	7.3	7.1	0.51
8	21 42	18 55 45.19	21 53 58.6	7.3	7.0	0.51
9	21 44	19 0 59.40	21 49 56.3	7.2	7.0	0.50
10	21 45	19 6 13.43	−21 45 15.6	7.2	7.0	0.50
11	21 46	19 11 27.25	21 39 56.5	7.2	6.9	0.50
12	21 48	19 16 40.80	21 33 59.1	7.1	6.9	0.50
13	21 49	19 21 54.03	21 27 23.7	7.1	6.9	0.49
14	21 50	19 27 6.90	21 20 10.4	7.0	6.8	0.49
15	21 51	19 32 19.34	−21 12 19.5	7.0	6.8	0.49
16	21 53	19 37 31.31	−21 3 51.2	7.0	6.8	0.48

Date.	Mean Time of Transit.	Apparent Right Ascension.	Apparent Declination.	Hor. Par.
	h m	h m s	° ′ ″	″
Feb. 15	21 51	19 32 19.34	−21 12 19.5	7.0
16	21 53	19 37 31.31	21 3 51.2	7.0
17	21 54	19 42 42.75	20 54 45.7	6.9
18	21 55	19 47 53.62	20 45 3.3	6.9
19	21 56	19 53 3.89	20 34 44.3	6.9
20	21 58	19 58 13.51	−20 23 49.2	6.8
21	21 59	20 3 22.45	20 12 18.4	6.8
22	22 0	20 8 30.66	20 0 12.2	6.8
23	22 1	20 13 38.11	19 47 31.0	6.7
24	22 2	20 18 44.76	19 34 15.3	6.7
25	22 3	20 23 50.60	−19 20 25.7	6.7
26	22 4	20 28 55.59	19 6 2.5	6.7
27	22 6	20 33 59.72	18 51 6.1	6.6
28	22 7	20 39 2.96	18 35 37.1	6.6
29	22 8	20 44 5.31	18 19 36.0	6.6
Mar. 1	22 9	20 49 6.74	−18 3 3.3	6.5
2	22 10	20 54 7.25	17 45 59.7	6.5
3	22 11	20 59 6.81	17 28 25.6	6.5
4	22 12	21 4 5.42	17 10 21.6	6.5
5	22 13	21 9 3.06	16 51 48.3	6.4
6	22 14	21 13 59.74	−16 32 46.2	6.4
7	22 15	21 18 55.45	16 13 16.0	6.4
8	22 16	21 23 50.19	15 53 18.3	6.4
9	22 17	21 28 43.95	15 32 53.7	6.3
10	22 18	21 33 36.74	15 12 3.0	6.3
11	22 19	21 38 28.55	−14 50 46.7	6.3
12	22 20	21 43 19.38	14 29 5.5	6.3
13	22 21	21 48 9.25	14 7 0.0	6.2
14	22 22	21 52 58.16	13 44 31.0	6.2
15	22 22	21 57 46.11	13 21 39.1	6.2
16	22 23	22 2 33.12	−12 58 25.0	6.2
17	22 24	22 7 19.20	12 34 49.5	6.2
18	22 25	22 12 4.37	12 10 53.3	6.1
19	22 26	22 16 48.63	11 46 36.9	6.1
20	22 26	22 21 32.00	11 22 1.1	6.1
21	22 27	22 26 14.50	−10 57 6.7	6.1
22	22 28	22 30 56.16	10 31 54.4	6.0
23	22 29	22 35 37.00	10 6 24.8	6.0
24	22 29	22 40 17.04	9 40 38.6	6.0
25	22 30	22 44 56.31	9 14 36.6	6.0
26	22 31	22 49 34.82	− 8 48 19.6	6.0
27	22 32	22 54 12.61	8 21 48.1	6.0
28	22 32	22 58 49.72	7 55 2.7	5.9
29	22 33	23 3 26.19	7 28 4.1	5.9
30	22 34	23 8 2.04	7 0 53.1	5.9
31	22 34	23 12 37.31	− 6 33 30.3	5.9
Apr. 1	22 35	23 17 12.02	− 6 5 56.5	5.9

FOR TRANSIT AT WASHINGTON.

ate.	Mean Time of Transit.	Apparent Right Ascension.	Apparent Declination.	Hor. Par.	Semidiam.	S.T. of Sem. Pass. Mer.	Date.	Mean Time of Transit.	Apparent Right Ascension.	Apparent Declination.	Hor. Par.	Semidiam.	S.T. of Sem. Pass. Mer.
	h m	h m s	° ′ ″	″	″	s		h m	h m s	° ′ ″	″	″	s
pr. 1	22 35	23 17 12.02	− 6 5 56.5	5.9	5.7	0.38	May 16	23 4	2 43 34.89	+14 38 33.8	5.3	5.1	0.35
2	22 35	23 21 46.21	5 38 12.2	5.8	5.7	0.38	17	23 4	2 48 23.47	15 2 5.8	5.3	5.1	0.35
3	22 36	23 26 19.92	5 10 18.1	5.8	5.6	0.38	18	23 5	2 53 13.09	15 25 15.7	5.3	5.1	0.35
4	22 37	23 30 53.18	4 42 15.0	5.8	5.6	0.38	19	23 6	2 58 3.76	15 48 2.8	5.3	5.1	0.35
5	22 37	23 35 26.03	4 14 3.5	5.8	5.6	0.38	20	23 7	3 2 55.50	16 10 26.5	5.2	5.1	0.35
6	22 38	23 39 58.51	− 3 45 44.3	5.8	5.6	0.37	21	23 8	3 7 48.32	+16 32 26.1	5.2	5.1	0.35
7	22 38	23 44 30.65	3 17 18.2	5.7	5.6	0.37	22	23 9	3 12 42.23	16 54 0.8	5.2	5.1	0.35
8	22 39	23 49 2.49	2 48 45.7	5.7	5.6	0.37	23	23 10	3 17 37.24	17 15 9.8	5.2	5.1	0.35
9	22 40	23 53 34.07	2 20 7.6	5.7	5.6	0.37	24	23 11	3 22 33.35	17 35 52.4	5.2	5.1	0.35
10	22 40	23 58 5.42	1 51 24.6	5.7	5.5	0.37	25	23 12	3 27 30.58	17 56 7.9	5.2	5.1	0.35
11	22 41	0 2 36.57	− 1 22 37.4	5.7	5.5	0.37	26	23 13	3 32 28.94	+18 15 55.7	5.2	5.0	0.35
12	22 41	0 7 7.56	0 53 46.7	5.7	5.5	0.37	27	23 14	3 37 28.41	18 35 15.1	5.2	5.0	0.35
13	22 42	0 11 38.42	− 0 24 53.2	5.7	5.5	0.37	28	23 15	3 42 29.00	18 54 5.5	5.2	5.0	0.35
14	22 42	0 16 9.20	+ 0 4 2.5	5.6	5.5	0.37	29	23 16	3 47 30.71	19 12 26.2	5.2	5.0	0.36
15	22 43	0 20 39.94	0 32 59.6	5.6	5.5	0.37	30	23 17	3 52 33.55	19 30 16.4	5.2	5.0	0.36
16	22 44	0 25 10.68	+ 1 1 57.5	5.6	5.4	0.36	31	23 18	3 57 37.50	+19 47 35.6	5.2	5.0	0.36
17	22 44	0 29 41.44	1 30 55.3	5.6	5.4	0.36	June 1	23 20	4 2 42.55	20 4 23.1	5.2	5.0	0.36
18	22 45	0 34 12.26	1 59 52.3	5.6	5.4	0.36	2	23 21	4 7 48.70	20 20 38.2	5.2	5.0	0.36
19	22 45	0 38 43.18	2 28 47.9	5.6	5.4	0.36	3	23 22	4 12 55.94	20 36 20.3	5.1	5.0	0.36
20	22 46	0 43 14.25	2 57 41.4	5.6	5.4	0.36	4	23 23	4 18 4.24	20 51 28.7	5.1	5.0	0.36
21	22 46	0 47 45.49	+ 3 26 32.1	5.5	5.4	0.36	5	23 24	4 23 13.58	+21 6 2.8	5.1	5.0	0.36
22	22 47	0 52 16.95	3 55 19.2	5.5	5.4	0.36	6	23 26	4 28 23.94	21 20 2.1	5.1	5.0	0.36
23	22 48	0 56 48.66	4 24 2.1	5.5	5.4	0.36	7	23 27	4 33 35.31	21 33 26.0	5.1	5.0	0.36
24	22 48	1 1 20.67	4 52 40.1	5.5	5.3	0.36	8	23 28	4 38 47.65	21 46 14.0	5.1	5.0	0.36
25	22 49	1 5 53.01	5 21 12.5	5.5	5.3	0.36	9	23 29	4 44 0.93	21 58 25.4	5.1	5.0	0.36
26	22 49	1 10 25.72	+ 5 49 38.7	5.5	5.3	0.36	10	23 31	4 49 15.11	+22 9 59.7	5.1	5.0	0.36
27	22 50	1 14 58.84	6 17 57.9	5.5	5.3	0.36	11	23 32	4 54 30.17	22 20 56.4	5.1	5.0	0.36
28	22 51	1 19 32.42	6 46 9.4	5.5	5.3	0.36	12	23 33	4 59 46.06	22 31 15.1	5.1	5.0	0.36
29	22 51	1 24 6.49	7 14 12.7	5.4	5.3	0.35	13	23 35	5 5 2.75	22 40 55.2	5.1	5.0	0.36
30	22 52	1 28 41.10	7 42 7.0	5.4	5.3	0.35	14	23 36	5 10 20.19	22 49 56.3	5.1	4.9	0.36
ay 1	22 52	1 33 16.27	+ 8 9 51.6	5.4	5.3	0.35	15	23 37	5 15 38.33	+22 58 17.9	5.1	4.9	0.36
2	22 53	1 37 52.04	8 37 25.8	5.4	5.2	0.35	16	23 39	5 20 57.11	23 5 59.7	5.1	4.9	0.36
3	22 54	1 42 28.46	9 4 48.9	5.4	5.2	0.35	17	23 40	5 26 16.50	23 13 1.4	5.1	4.9	0.36
4	22 54	1 47 5.56	9 32 0.2	5.4	5.2	0.35	18	23 41	5 31 36.45	23 19 22.5	5.1	4.9	0.36
5	22 55	1 51 43.37	9 58 59.0	5.4	5.2	0.35	19	23 43	5 36 56.91	23 25 2.8	5.1	4.9	0.36
6	22 56	1 56 21.92	+10 25 44.6	5.4	5.2	0.35	20	23 44	5 42 17.81	+23 30 2.0	5.1	4.9	0.36
7	22 57	2 1 1.24	10 52 16.3	5.4	5.2	0.35	21	23 46	5 47 39.10	23 34 19.9	5.1	4.9	0.36
8	22 57	2 5 41.38	11 18 33.3	5.4	5.2	0.35	22	23 47	5 53 0.74	23 37 56.1	5.1	4.9	0.36
9	22 58	2 10 22.36	11 44 34.9	5.3	5.2	0.35	23	23 48	5 58 22.67	23 40 50.4	5.1	4.9	0.36
10	22 59	2 15 4.21	12 10 20.3	5.3	5.2	0.35	24	23 50	6 3 44.83	23 43 2.8	5.1	4.9	0.36
11	23 0	2 19 46.95	+12 35 48.9	5.3	5.2	0.35	25	23 51	6 9 7.16	+23 44 33.2	5.1	4.9	0.36
12	23 0	2 24 30.61	13 1 0.0	5.3	5.2	0.35	26	23 53	6 14 29.62	23 45 21.5	5.1	4.9	0.36
13	23 1	2 29 15.21	13 25 52.8	5.3	5.1	0.35	27	23 54	6 19 52.14	23 45 27.5	5.1	4.9	0.36
14	23 2	2 34 0.78	13 50 26.5	5.3	5.1	0.35	28	23 56	6 25 14.67	23 44 51.2	5.1	4.9	0.36
15	23 3	2 38 47.33	14 14 40.4	5.3	5.1	0.35	29	23 57	6 30 37.15	23 43 32.5	5.1	4.9	0.36
16	23 4	2 43 34.89	+14 38 33.8	5.3	5.1	0.35	30	23 58	6 35 59.54	+23 41 31.5	5.1	4.9	0.36
17	23 4	2 48 23.47	+15 2 5.8	5.3	5.1	0.35	July 2	0 0	6 41 21.76	+23 38 48.2	5.1	4.9	0.36

FOR TRANSIT AT WASHINGTON.

Date.	Mean Time of Transit.	Apparent Right Ascension.	Apparent Declination.	Hor. Par.	Semidiam.	S.T. of Sem. Pass. Mer.	Date.	Mean Time of Transit.	Apparent Right Ascension.	Apparent Declination.	Hor. Par.	Semidiam.	S.T. of Sem. Pass. Mer.
	h m	h m s	° ′ ″	″	″	s		h m	h m s	° ′ ″	″	″	s
July 2	0 0	6 41 21.76	+23 38 48.2	5.1	4.9	0.36	Aug 16	0 50	10 29 19.77	+11 2 42.8	5.2	5.1	0.35
3	0 1	6 46 43.76	23 35 22.6	5.1	4.9	0.36	17	0 51	10 34 0.02	10 35 15.6	5.2	5.1	0.35
4	0 3	6 52 5.48	23 31 14.9	5.1	4.9	0.36	18	0 52	10 38 39.40	10 7 31.6	5.3	5.1	0.35
5	0 4	6 57 26.88	23 26 25.3	5.1	4.9	0.36	19	0 52	10 43 17.93	9 39 31.4	5.3	5.1	0.35
6	0 6	7 2 47.90	23 20 54.0	5.1	4.9	0.36	20	0 53	10 47 55.65	9 11 15.7	5.3	5.1	0.35
7	0 7	7 8 8.49	+23 14 41.1	5.1	4.9	0.36	21	0 54	10 52 32.59	+ 8 42 45.3	5.3	5.1	0.35
8	0 8	7 13 28.58	23 7 46.8	5.1	4.9	0.36	22	0 54	10 57 8.77	8 14 0.9	5.3	5.1	0.35
9	0 10	7 18 48.13	23 0 11.2	5.1	4.9	0.36	23	0 55	11 1 44.23	7 45 3.4	5.3	5.1	0.35
10	0 11	7 24 7.09	22 51 54.7	5.1	4.9	0.36	24	0 56	11 6 19.01	7 15 53.4	5.3	5.1	0.35
11	0 12	7 29 25.41	22 42 57.7	5.1	4.9	0.36	25	0 56	11 10 53.16	6 46 31.5	5.3	5.2	0.35
12	0 14	7 34 43.04	+22 33 20.5	5.1	4.9	0.36	26	0 57	11 15 26.71	+ 6 16 58.6	5.3	5.2	0.35
13	0 15	7 39 59.93	22 23 3.4	5.1	4.9	0.36	27	0 58	11 19 59.69	5 47 15.3	5.3	5.2	0.35
14	0 16	7 45 16.04	22 12 6.7	5.1	4.9	0.36	28	0 58	11 24 32.16	5 17 22.5	5.3	5.2	0.35
15	0 18	7 50 31.32	22 0 31.0	5.1	4.9	0.35	29	0 59	11 29 4.15	4 47 20.7	5.3	5.2	0.35
16	0 19	7 55 45.73	21 48 16.7	5.1	4.9	0.35	30	0 59	11 33 35.69	4 17 10.7	5.3	5.2	0.35
17	0 20	8 0 59.23	+21 35 24.4	5.1	4.9	0.35	31	1 0	11 38 6.83	+ 3 46 53.1	5.4	5.2	0.35
18	0 22	8 6 11.79	21 21 54.5	5.1	4.9	0.35	Sept. 1	1 1	11 42 37.62	3 16 28.7	5.4	5.2	0.35
19	0 23	8 11 23.37	21 7 47.4	5.1	4.9	0.35	2	1 1	11 47 8.09	2 45 58.2	5.4	5.2	0.35
20	0 24	8 16 33.95	20 53 3.7	5.1	4.9	0.35	3	1 2	11 51 38.29	2 15 22.4	5.4	5.2	0.35
21	0 25	8 21 43.49	20 37 43.8	5.1	4.9	0.35	4	1 2	11 56 8.27	1 44 41.9	5.4	5.2	0.35
22	0 26	8 26 51.97	+20 21 48.4	5.1	4.9	0.35	5	1 3	12 0 38.07	+ 1 13 57.4	5.4	5.3	0.35
23	0 28	8 31 59.36	20 5 18.2	5.1	4.9	0.35	6	1 3	12 5 7.74	0 43 9.6	5.4	5.3	0.35
24	0 29	8 37 5.64	19 48 13.7	5.1	4.9	0.35	7	1 4	12 9 37.31	+ 0 12 19.4	5.4	5.3	0.35
25	0 30	8 42 10.80	19 30 35.5	5.1	5.0	0.35	8	1 4	12 14 6.81	− 0 18 32.7	5.4	5.3	0.35
26	0 31	8 47 14.83	19 12 24.2	5.1	5.0	0.35	9	1 5	12 18 36.30	0 49 25.9	5.5	5.3	0.35
27	0 32	8 52 17.73	+18 53 40.4	5.1	5.0	0.35	10	1 6	12 23 5.81	− 1 20 19.5	5.5	5.3	0.35
28	0 33	8 57 19.49	18 34 24.8	5.1	5.0	0.35	11	1 6	12 27 35.40	1 51 12.6	5.5	5.3	0.35
29	0 34	9 2 20.10	18 14 37.9	5.1	5.0	0.35	12	1 7	12 32 5.10	2 22 4.5	5.5	5.3	0.36
30	0 35	9 7 19.55	17 54 20.5	5.1	5.0	0.35	13	1 7	12 36 34.95	2 52 54.5	5.5	5.4	0.36
31	0 36	9 12 17.83	17 33 33.3	5.1	5.0	0.35	14	1 8	12 41 4.99	3 23 42.0	5.5	5.4	0.36
Aug. 1	0 37	9 17 14.95	+17 12 16.9	5.1	5.0	0.35	15	1 8	12 45 35.26	− 3 54 26.0	5.5	5.4	0.36
2	0 38	9 22 10.92	16 50 32.0	5.1	5.0	0.35	16	1 9	12 50 5.81	4 25 5.8	5.6	5.4	0.36
3	0 39	9 27 5.75	16 28 19.3	5.1	5.0	0.35	17	1 9	12 54 36.67	4 55 40.8	5.6	5.4	0.36
4	0 40	9 31 59.44	16 5 39.4	5.2	5.0	0.35	18	1 10	12 59 7.88	5 26 10.2	5.6	5.4	0.36
5	0 41	9 36 52.00	15 42 33.0	5.2	5.0	0.35	19	1 11	13 3 39.49	5 56 33.2	5.6	5.4	0.36
6	0 42	9 41 43.44	+15 19 0.9	5.2	5.0	0.35	20	1 11	13 8 11.53	− 6 26 49.0	5.6	5.5	0.37
7	0 43	9 46 33.78	14 55 3.8	5.2	5.0	0.35	21	1 12	13 12 44.05	6 56 57.0	5.6	5.5	0.37
8	0 44	9 51 23.02	14 30 42.4	5.2	5.0	0.35	22	1 12	13 17 17.09	7 26 56.4	5.6	5.5	0.37
9	0 45	9 56 11.18	14 5 57.3	5.2	5.0	0.35	23	1 13	13 21 50.70	7 56 46.4	5.7	5.5	0.37
10	0 46	10 0 58.29	13 40 49.3	5.2	5.0	0.35	24	1 14	13 26 24.92	8 26 26.4	5.7	5.5	0.37
11	0 46	10 5 44.36	+13 15 19.2	5.2	5.0	0.35	25	1 14	13 30 59.77	− 8 55 55.5	5.7	5.5	0.37
12	0 47	10 10 29.40	12 49 27.7	5.2	5.0	0.35	26	1 15	13 35 35.30	9 25 13.1	5.7	5.5	0.37
13	0 48	10 15 13.43	12 23 15.6	5.2	5.1	0.35	27	1 16	13 40 11.55	9 54 18.4	5.7	5.5	0.38
14	0 49	10 19 56.49	11 56 43.6	5.2	5.1	0.35	28	1 16	13 44 48.56	10 23 10.7	5.7	5.6	0.38
15	0 50	10 24 38.60	11 29 52.4	5.2	5.1	0.35	29	1 17	13 49 26.37	10 51 49.1	5.7	5.6	0.38
16	0 50	10 29 19.77	+11 2 42.8	5.2	5.1	0.35	30	1 18	13 54 5.01	−11 20 13.0	5.8	5.6	0.38
17	0 51	10 34 0.02	+10 35 15.6	5.2	5.1	0.35	Oct. 1	1 18	13 58 44.52	−11 48 21.7	5.8	5.6	0.38

FOR TRANSIT AT WASHINGTON.

Date.	Mean Time of Transit.	Apparent Right Ascension.	Apparent Declination.	Hor. Par.	Semidiam.	S.T. of Sem. Pass. Mer.	Date.	Mean Time of Transit.	Apparent Right Ascension.	Apparent Declination.	Hor. Par.	Semidiam.	S.T. of Sem. Pass. Mer.
	h m	h m s	° ′ ″	″	″	s		h m	h m s	° ′ ″	″	″	s
Oct. 1	1 18	13 58 44.52	−11 48 21.7	5.8	5.6	0.38	Nov. 16	2 10	17 52 24.83	−25 8 23.3	6.8	6.6	0.49
2	1 19	14 3 24.95	12 16 14.3	5.8	5.6	0.38	17	2 12	17 57 48.83	25 10 54.9	6.9	6.7	0.49
3	1 20	14 8 6.32	12 43 49.9	5.8	5.7	0.39	18	2 13	18 3 12.88	25 12 41.5	6.9	6.7	0.49
4	1 20	14 12 48.66	13 11 8.0	5.8	5.7	0.39	19	2 15	18 8 36.90	25 13 43.1	6.9	6.7	0.49
5	1 21	14 17 32.00	13 38 7.8	5.8	5.7	0.39	20	2 16	18 14 0.83	25 13 59.6	7.0	6.7	0.50
6	1 22	14 22 16.38	−14 4 48.4	5.9	5.7	0.39	21	2 18	18 19 24.59	−25 13 31.1	7.0	6.8	0.50
7	1 23	14 27 1.82	14 31 9.0	5.9	5.7	0.39	22	2 19	18 24 48.12	25 12 17.6	7.0	6.8	0.50
8	1 24	14 31 48.34	14 57 8.9	5.9	5.7	0.40	23	2 21	18 30 11.34	25 10 19.2	7.1	6.8	0.50
9	1 24	14 36 35.98	15 22 47.2	5.9	5.7	0.40	24	2 22	18 35 34.18	25 7 35.9	7.1	6.9	0.51
10	1 25	14 41 24.74	15 48 3.2	5.9	5.8	0.40	25	2 24	18 40 56.57	25 4 7.8	7.1	6.9	0.51
11	1 26	14 46 14.64	−16 12 56.1	6.0	5.8	0.40	26	2 25	18 46 18.45	−24 59 55.2	7.2	6.9	0.51
12	1 27	14 51 5.71	16 37 25.0	6.0	5.8	0.40	27	2 26	18 51 39.74	24 54 58.2	7.2	7.0	0.51
13	1 28	14 55 57.95	17 1 29.1	6.0	5.8	0.41	28	2 28	18 57 0.39	24 49 17.0	7.2	7.0	0.51
14	1 29	15 0 51.38	17 25 7.7	6.0	5.8	0.41	29	2 29	19 2 20.35	24 42 51.9	7.3	7.0	0.52
15	1 30	15 5 46.00	17 48 19.9	6.0	5.9	0.41	30	2 30	19 7 39.55	24 35 43.2	7.3	7.1	0.52
16	1 31	15 10 41.83	−18 11 4.9	6.0	5.9	0.41	Dec. 1	2 32	19 12 57.92	−24 27 51.3	7.3	7.1	0.52
17	1 32	15 15 38.87	18 33 22.1	6.1	5.9	0.41	2	2 33	19 18 15.39	24 19 16.4	7.4	7.2	0.52
18	1 33	15 20 37.13	18 55 10.6	6.1	5.9	0.42	3	2 34	19 23 31.92	24 9 59.0	7.4	7.2	0.53
19	1 34	15 25 36.60	19 16 29.5	6.1	5.9	0.42	4	2 36	19 28 47.44	23 59 59.5	7.4	7.2	0.53
20	1 35	15 30 37.28	19 37 18.2	6.1	6.0	0.42	5	2 37	19 34 1.90	23 49 18.3	7.5	7.3	0.53
21	1 36	15 35 39.17	−19 57 35.9	6.2	6.0	0.42	6	2 38	19 39 15.24	−23 37 55.8	7.5	7.3	0.53
22	1 37	15 40 42.27	20 17 21.9	6.2	6.0	0.43	7	2 40	19 44 27.42	23 25 52.6	7.6	7.4	0.53
23	1 38	15 45 46.58	20 36 35.5	6.2	6.0	0.43	8	2 41	19 49 38.39	23 13 9.2	7.6	7.4	0.54
24	1 40	15 50 52.08	20 55 15.9	6.2	6.0	0.43	9	2 42	19 54 48.09	22 59 46.1	7.7	7.4	0.54
25	1 41	15 55 58.76	21 13 22.5	6.2	6.1	0.43	10	2 43	19 59 56.48	22 45 44.0	7.7	7.5	0.54
26	1 42	16 1 6.60	−21 30 54.5	6.3	6.1	0.44	11	2 44	20 5 3.50	−22 31 3.5	7.7	7.5	0.54
27	1 43	16 6 15.59	21 47 51.3	6.3	6.1	0.44	12	2 46	20 10 9.12	22 15 45.1	7.8	7.6	0.55
28	1 44	16 11 25.71	22 4 12.2	6.3	6.1	0.44	13	2 47	20 15 13.30	21 59 49.5	7.8	7.6	0.55
29	1 46	16 16 36.94	22 19 56.4	6.3	6.2	0.44	14	2 48	20 20 16.00	21 43 17.4	7.9	7.6	0.55
30	1 47	16 21 49.24	22 35 3.4	6.4	6.2	0.45	15	2 49	20 25 17.20	21 26 9.6	7.9	7.7	0.55
31	1 48	16 27 2.59	−22 49 32.6	6.4	6.2	0.45	16	2 50	20 30 16.87	−21 8 26.7	8.0	7.7	0.55
Nov. 1	1 50	16 32 16.98	23 3 23.4	6.4	6.2	0.45	17	2 51	20 35 14.97	20 50 9.3	8.0	7.8	0.56
2	1 51	16 37 32.38	23 16 35.2	6.4	6.2	0.45	18	2 52	20 40 11.47	20 31 18.3	8.1	7.8	0.56
3	1 52	16 42 48.72	23 29 7.3	6.5	6.3	0.45	19	2 53	20 45 6.35	20 11 54.5	8.1	7.9	0.56
4	1 53	16 48 5.97	23 40 59.2	6.5	6.3	0.46	20	2 54	20 49 59.60	19 51 58.5	8.1	7.9	0.56
5	1 55	16 53 24.08	−23 52 10.5	6.5	6.3	0.46	21	2 55	20 54 51.21	−19 31 31.1	8.2	8.0	0.56
6	1 56	16 58 43.01	24 2 40.6	6.5	6.3	0.46	22	2 56	20 59 41.16	19 10 33.0	8.2	8.0	0.57
7	1 58	17 4 2.72	24 12 29.1	6.6	6.4	0.46	23	2 56	21 4 29.43	18 49 5.2	8.3	8.1	0.57
8	1 59	17 9 23.14	24 21 35.4	6.6	6.4	0.47	24	2 57	21 9 16.04	18 27 8.3	8.4	8.1	0.57
9	2 0	17 14 44.22	24 29 59.0	6.6	6.4	0.47	25	2 58	21 14 0.97	18 4 43.1	8.4	8.2	0.57
10	2 2	17 20 5.90	−24 37 39.7	6.7	6.5	0.47	26	2 59	21 18 44.22	−17 41 50.5	8.5	8.2	0.57
11	2 3	17 25 28.11	24 44 37.1	6.7	6.5	0.48	27	3 0	21 23 25.79	17 18 31.1	8.5	8.3	0.58
12	2 5	17 30 50.79	24 50 50.7	6.7	6.5	0.48	28	3 0	21 28 5.69	16 54 45.7	8.6	8.3	0.58
13	2 6	17 36 13.86	24 56 20.4	6.7	6.6	0.48	29	3 1	21 32 43.92	16 30 35.1	8.6	8.4	0.58
14	2 8	17 41 37.27	25 1 6.0	6.8	6.6	0.48	30	3 2	21 37 20.50	16 6 0.1	8.7	8.4	0.59
15	2 9	17 47 0.95	−25 5 7.0	6.8	6.6	0.48	31	3 2	21 41 55.42	−15 41 1.4	8.8	8.5	0.59
16	2 10	17 52 24.83	−25 8 23.3	6.8	6.6	0.49	32	3 3	21 46 28.70	−15 15 39.9	8.8	8.6	0.59

MARS, 1912.

FOR TRANSIT AT WASHINGTON.

Date.	Mean Time of Transit.	Apparent Right Ascension.	Apparent Declination.	Hor. Par.	Semidiam.	S.T. of Sem. Pass. Mer.	Date.	Mean Time of Transit.	Apparent Right Ascension.	Apparent Declination.	Hor. Par.	Semidiam.	S.T. of Sem. Pass. Mer.
	h m	h m s	° ′ ″	″	″	s		h m	h m s	° ′ ″	″	″	s
Jan. 1	8 44	3 25 42.65	+21 1 15.9	12.7	7.2	0.52	Feb. 16	6 34	4 16 10.30	+23 31 22.5	7.9	4.5	0.33
2	8 41	3 25 54.50	21 2 28.5	12.5	7.1	0.51	17	6 32	4 17 57.43	23 35 21.0	7.8	4.5	0.33
3	8 37	3 26 9.44	21 3 49.7	12.3	7.1	0.51	18	6 30	4 19 45.81	23 39 17.7	7.8	4.5	0.33
4	8 33	3 26 27.42	21 5 19.3	12.2	7.0	0.50	19	6 27	4 21 35.41	23 43 12.4	7.7	4.4	0.32
5	8 30	3 26 48.38	21 6 57.1	12.1	6.9	0.50	20	6 25	4 23 26.20	23 47 4.9	7.6	4.4	0.32
6	8 26	3 27 12.26	+21 8 42.9	11.9	6.9	0.50	21	6 23	4 25 18.14	+23 50 54.9	7.6	4.3	0.32
7	8 23	3 27 39.01	21 10 36.5	11.8	6.8	0.49	22	6 21	4 27 11.21	23 54 42.3	7.5	4.3	0.31
8	8 19	3 28 8.59	21 12 37.8	11.6	6.7	0.49	23	6 19	4 29 5.38	23 58 26.8	7.4	4.3	0.31
9	8 16	3 28 40.96	21 14 46.6	11.5	6.6	0.48	24	6 17	4 31 0.62	24 2 8.3	7.4	4.2	0.31
10	8 12	3 29 16.07	21 17 2.8	11.4	6.6	0.47	25	6 15	4 32 56.92	24 5 46.6	7.3	4.2	0.31
11	8 9	3 29 53.86	+21 19 26.1	11.3	6.5	0.47	26	6 13	4 34 54.25	+24 9 21.4	7.3	4.2	0.30
12	8 6	3 30 34.28	21 21 56.4	11.2	6.4	0.47	27	6 11	4 36 52.58	24 12 52.6	7.2	4.1	0.30
13	8 3	3 31 17.31	21 24 33.4	11.0	6.4	0.46	28	6 9	4 38 51.89	24 16 20.1	7.1	4.1	0.30
14	8 0	3 32 2.91	21 27 17.0	10.9	6.3	0.46	29	6 7	4 40 52.14	24 19 43.6	7.1	4.1	0.30
15	7 56	3 32 51.02	21 30 6.8	10.8	6.2	0.45	Mar. 1	6 5	4 42 53.31	24 23 2.9	7.0	4.0	0.30
16	7 53	3 33 41.59	+21 33 2.7	10.7	6.1	0.45	2	6 3	4 44 55.38	+24 26 17.9	7.0	4.0	0.29
17	7 50	3 34 34.59	21 36 4.6	10.6	6.1	0.44	3	6 2	4 46 58.32	24 29 28.4	6.9	4.0	0.29
18	7 47	3 35 29.96	21 39 12.2	10.5	6.0	0.44	4	6 0	4 49 2.11	24 32 34.3	6.8	3.9	0.29
19	7 44	3 36 27.66	21 42 25.2	10.4	6.0	0.43	5	5 58	4 51 6.75	24 35 35.5	6.8	3.9	0.29
20	7 41	3 37 27.65	21 45 43.4	10.3	5.9	0.43	6	5 56	4 53 12.22	24 38 31.7	6.7	3.9	0.28
21	7 38	3 38 29.87	+21 49 6.5	10.2	5.8	0.42	7	5 54	4 55 18.50	+24 41 22.9	6.7	3.8	0.28
22	7 36	3 39 34.28	21 52 34.2	10.1	5.8	0.42	8	5 52	4 57 25.58	24 44 8.9	6.6	3.8	0.28
23	7 33	3 40 40.83	21 56 6.3	9.9	5.7	0.41	9	5 50	4 59 33.45	24 46 49.7	6.6	3.8	0.28
24	7 30	3 41 49.48	21 59 42.6	9.8	5.7	0.41	10	5 49	5 1 42.09	24 49 25.0	6.5	3.8	0.28
25	7 27	3 43 0.18	22 3 22.7	9.7	5.6	0.40	11	5 47	5 3 51.49	24 51 54.8	6.5	3.7	0.27
26	7 24	3 44 12.89	+22 7 6.4	9.6	5.5	0.40	12	5 45	5 6 1.62	+24 54 18.8	6.4	3.7	0.27
27	7 22	3 45 27.56	22 10 53.3	9.5	5.5	0.40	13	5 43	5 8 12.46	24 56 37.0	6.4	3.7	0.27
28	7 19	3 46 44.15	22 14 43.1	9.4	5.4	0.39	14	5 42	5 10 24.00	24 58 49.2	6.4	3.6	0.27
29	7 16	3 48 2.62	22 18 35.6	9.3	5.4	0.39	15	5 40	5 12 36.23	25 0 55.4	6.3	3.6	0.27
30	7 14	3 49 22.90	22 22 30.6	9.3	5.3	0.39	16	5 38	5 14 49.14	25 2 55.4	6.3	3.6	0.27
31	7 11	3 50 44.95	+22 26 27.9	9.2	5.3	0.38	17	5 36	5 17 2.72	+25 4 49.1	6.2	3.6	0.27
Feb. 1	7 9	3 52 8.74	22 30 27.1	9.1	5.2	0.38	18	5 35	5 19 16.95	25 6 36.4	6.2	3.5	0.26
2	7 6	3 53 34.22	22 34 27.9	9.0	5.2	0.38	19	5 33	5 21 31.81	25 8 17.2	6.1	3.5	0.26
3	7 4	3 55 1.33	22 38 30.1	8.9	5.1	0.37	20	5 31	5 23 47.28	25 9 51.4	6.1	3.5	0.26
4	7 1	3 56 30.05	22 42 33.4	8.8	5.1	0.37	21	5 30	5 26 3.35	25 11 18.8	6.1	3.5	0.26
5	6 59	3 58 0.36	+22 46 37.6	8.7	5.0	0.36	22	5 28	5 28 19.99	+25 12 39.2	6.0	3.4	0.26
6	6 56	3 59 32.23	22 50 42.5	8.6	5.0	0.36	23	5 26	5 30 37.19	25 13 52.6	6.0	3.4	0.25
7	6 54	4 1 5.63	22 54 47.8	8.6	4.9	0.36	24	5 25	5 32 54.93	25 14 58.8	5.9	3.4	0.25
8	6 52	4 2 40.53	22 58 53.4	8.5	4.9	0.36	25	5 23	5 35 13.20	25 15 57.9	5.9	3.4	0.25
9	6 49	4 4 16.89	23 2 59.0	8.4	4.8	0.35	26	5 22	5 37 31.97	25 16 49.7	5.8	3.4	0.25
10	6 47	4 5 54.69	+23 7 4.5	8.4	4.8	0.35	27	5 20	5 39 51.23	+25 17 34.2	5.8	3.4	0.25
11	6 45	4 7 33.90	23 11 9.6	8.3	4.7	0.35	28	5 18	5 42 10.96	25 18 11.3	5.7	3.3	0.25
12	6 43	4 9 14.50	23 15 14.2	8.2	4.7	0.34	29	5 17	5 44 31.15	25 18 40.8	5.7	3.3	0.24
13	6 40	4 10 56.46	23 19 18.0	8.1	4.7	0.34	30	5 15	5 46 51.78	25 19 2.7	5.7	3.3	0.24
14	6 38	4 12 39.76	23 23 20.8	8.0	4.6	0.34	31	5 14	5 49 12.83	25 19 16.9	5.7	3.3	0.24
15	6 36	4 14 24.38	+23 27 22.4	8.0	4.6	0.33	Apr. 1	5 12	5 51 34.28	+25 19 23.3	5.7	3.3	0.24
16	6 34	4 16 10.30	+23 31 22.5	7.9	4.5	0.33	2	5 10	5 53 56.12	+25 19 21.8	5.6	3.2	0.24

JUPITER, 1912.

FOR TRANSIT AT WASHINGTON.

Date.	Mean Time of Transit.	Apparent Right Ascension.	Apparent Declination.	Hor. Par.	Semidiam.	S.T. of Sem. Pass. Mer.
	h m	h m s	° ′ ″	″	″	s
Mar. 1	18 12	16 51 3.76	−21 43 18.8	1.6	17.7	1.35
2	18 8	16 51 26.26	21 43 52.8	1.6	17.7	1.36
3	18 4	16 51 48.08	21 44 25.5	1.7	17.8	1.36
4	18 1	16 52 9.22	21 44 56.8	1.7	17.8	1.36
5	17 57	16 52 29.66	21 45 26.7	1.7	17.9	1.37
6	17 54	16 52 49.39	−21 45 55.3	1.7	17.9	1.37
7	17 50	16 53 8.41	21 46 22.7	1.7	18.0	1.38
8	17 46	16 53 26.72	21 46 48.7	1.7	18.0	1.38
9	17 43	16 53 44.30	21 47 13.4	1.7	18.1	1.38
10	17 39	16 54 1.15	21 47 36.9	1.7	18.1	1.39
11	17 35	16 54 17.27	−21 47 59.2	1.7	18.2	1.39
12	17 32	16 54 32.64	21 48 20.2	1.7	18.3	1.40
13	17 28	16 54 47.26	21 48 39.8	1.7	18.3	1.40
14	17 24	16 55 1.13	21 48 58.2	1.7	18.4	1.41
15	17 21	16 55 14.24	21 49 15.3	1.7	18.4	1.41
16	17 17	16 55 26.59	−21 49 31.2	1.7	18.5	1.42
17	17 13	16 55 38.16	21 49 45.9	1.7	18.6	1.42
18	17 10	16 55 48.95	21 49 59.3	1.7	18.6	1.43
19	17 6	16 55 58.96	21 50 11.5	1.7	18.7	1.43
20	17 2	16 56 8.20	21 50 22.4	1.7	18.7	1.44
21	16 58	16 56 16.65	−21 50 32.1	1.8	18.8	1.44
22	16 54	16 56 24.31	21 50 40.6	1.8	18.9	1.44
23	16 50	16 56 31.19	21 50 47.9	1.8	18.9	1.45
24	16 47	16 56 37.27	21 50 54.1	1.8	19.0	1.45
25	16 43	16 56 42.56	21 50 59.1	1.8	19.1	1.46
26	16 39	16 56 47.05	−21 51 2.9	1.8	19.1	1.46
27	16 35	16 56 50.75	21 51 5.6	1.8	19.2	1.47
28	16 31	16 56 53.66	21 51 7.2	1.8	19.2	1.47
29	16 27	16 56 55.78	21 51 7.6	1.8	19.3	1.48
30	16 23	16 56 57.10	21 51 6.8	1.8	19.3	1.48
31	16 20	16 56 57.62	−21 51 4.9	1.8	19.4	1.49
Apr. 1	16 16	16 56 57.34	21 51 1.8	1.8	19.5	1.49
2	16 12	16 56 56.26	21 50 57.6	1.8	19.5	1.49
3	16 8	16 56 54.38	21 50 52.2	1.8	19.6	1.50
4	16 4	16 56 51.70	21 50 45.7	1.8	19.6	1.50
5	16 0	16 56 48.23	−21 50 38.0	1.8	19.7	1.51
6	15 56	16 56 43.96	21 50 29.2	1.8	19.8	1.51
7	15 52	16 56 38.89	21 50 19.3	1.8	19.8	1.52
8	15 48	16 56 33.03	21 50 8.2	1.8	19.9	1.52
9	15 44	16 56 26.38	21 49 56.0	1.9	19.9	1.52
10	15 40	16 56 18.94	−21 49 42.6	1.9	20.0	1.53
11	15 36	16 56 10.71	21 49 28.1	1.9	20.0	1.53
12	15 31	16 56 1.70	21 49 12.5	1.9	20.1	1.54
13	15 27	16 55 51.90	21 48 55.7	1.9	20.2	1.54
14	15 23	16 55 41.33	21 48 37.8	1.9	20.2	1.55
15	15 19	16 55 29.99	−21 48 18.7	1.9	20.3	1.55
16	15 15	16 55 17.89	−21 47 58.6	1.9	20.3	1.55
Apr. 16	15 15	16 55 17.89	−21 47 58.6	1.9	20.3	1.55
17	15 11	16 55 5.03	21 47 37.3	1.9	20.4	1.56
18	15 7	16 54 51.43	21 47 14.9	1.9	20.4	1.56
19	15 3	16 54 37.09	21 46 51.4	1.9	20.5	1.57
20	14 58	16 54 22.01	21 46 26.9	1.9	20.5	1.57
21	14 54	16 54 6.20	−21 46 1.2	1.9	20.6	1.57
22	14 50	16 53 49.69	21 45 34.4	1.9	20.6	1.58
23	14 46	16 53 32.48	21 45 6.5	1.9	20.7	1.58
24	14 41	16 53 14.57	21 44 37.6	1.9	20.7	1.59
25	14 37	16 52 55.98	21 44 7.6	1.9	20.8	1.59
26	14 33	16 52 36.73	−21 43 36.6	1.9	20.8	1.59
27	14 29	16 52 16.82	21 43 4.5	1.9	20.9	1.60
28	14 24	16 51 56.26	21 42 31.4	1.9	20.9	1.60
29	14 20	16 51 35.07	21 41 57.2	1.9	21.0	1.60
30	14 16	16 51 13.26	21 41 22.0	2.0	21.0	1.61
May 1	14 12	16 50 50.85	−21 40 45.7	2.0	21.1	1.61
2	14 7	16 50 27.84	21 40 8.4	2.0	21.1	1.61
3	14 3	16 50 4.24	21 39 30.0	2.0	21.2	1.62
4	13 59	16 49 40.08	21 38 50.6	2.0	21.2	1.62
5	13 54	16 49 15.37	21 38 10.3	2.0	21.2	1.62
6	13 50	16 48 50.12	−21 37 29.1	2.0	21.3	1.62
7	13 46	16 48 24.34	21 36 46.8	2.0	21.3	1.63
8	13 41	16 47 58.06	21 36 3.6	2.0	21.3	1.63
9	13 37	16 47 31.29	21 35 19.4	2.0	21.4	1.63
10	13 32	16 47 4.04	21 34 34.3	2.0	21.4	1.63
11	13 28	16 46 36.33	−21 33 48.3	2.0	21.4	1.64
12	13 24	16 46 8.19	21 33 1.3	2.0	21.5	1.64
13	13 19	16 45 39.63	21 32 13.5	2.0	21.5	1.64
14	13 15	16 45 10.67	21 31 24.9	2.0	21.5	1.64
15	13 10	16 44 41.32	21 30 35.5	2.0	21.6	1.65
16	13 6	16 44 11.62	−21 29 45.4	2.0	21.6	1.65
17	13 2	16 43 41.58	21 28 54.4	2.0	21.6	1.65
18	12 57	16 43 11.23	21 28 2.6	2.0	21.6	1.65
19	12 53	16 42 40.59	21 27 10.1	2.0	21.7	1.65
20	12 48	16 42 9.69	21 26 17.0	2.0	21.7	1.65
21	12 44	16 41 38.54	−21 25 23.3	2.0	21.7	1.66
22	12 39	16 41 7.16	21 24 29.1	2.0	21.7	1.66
23	12 35	16 40 35.57	21 23 34.3	2.0	21.7	1.66
24	12 31	16 40 3.80	21 22 38.9	2.0	21.8	1.66
25	12 26	16 39 31.88	21 21 43.0	2.0	21.8	1.66
26	12 21	16 38 59.82	−21 20 46.7	2.0	21.8	1.66
27	12 17	16 38 27.64	21 19 50.0	2.0	21.8	1.66
28	12 12	16 37 55.37	21 18 52.9	2.0	21.8	1.66
29	12 8	16 37 23.03	21 17 55.4	2.0	21.8	1.66
30	12 4	16 36 50.63	21 16 57.6	2.0	21.8	1.66
31	11 59	16 36 18.21	−21 15 59.5	2.0	21.8	1.66
June 1	11 54	16 35 45.77	−21 15 1.2	2.0	21.8	1.66

JUPITER, 1912.

FOR TRANSIT AT WASHINGTON.

Date.	Mean Time of Transit.	Apparent Right Ascension.	Apparent Declination.	Hor. Par.	Semidiam.	S.T. of Sem. Pass. Mer.
	h m	h m s	° ′ ″	″	″	s
June 1	11 54	16 35 45.77	−21 15 1.2	2.0	21.8	1.66
2	11 50	16 35 13.35	21 14 2.6	2.0	21.8	1.66
3	11 46	16 34 40.97	21 13 3.9	2.0	21.8	1.66
4	11 41	16 34 8.65	21 12 5.1	2.0	21.8	1.66
5	11 37	16 33 36.40	21 11 6.3	2.0	21.8	1.66
6	11 32	16 33 4.25	−21 10 7.4	2.0	21.8	1.66
7	11 28	16 32 32.23	21 9 8.6	2.0	21.8	1.66
8	11 23	16 32 0.35	21 8 9.9	2.0	21.8	1.66
9	11 19	16 31 28.63	21 7 11.3	2.0	21.8	1.66
10	11 14	16 30 57.10	21 6 13.0	2.0	21.8	1.66
11	11 10	16 30 25.79	−21 5 14.9	2.0	21.8	1.66
12	11 6	16 29 54.71	21 4 17.1	2.0	21.8	1.65
13	11 1	16 29 23.89	21 3 19.6	2.0	21.7	1.65
14	10 57	16 28 53.34	21 2 22.6	2.0	21.7	1.65
15	10 52	16 28 23.08	21 1 26.0	2.0	21.7	1.65
16	10 48	16 27 53.15	−21 0 29.9	2.0	21.7	1.65
17	10 43	16 27 23.56	20 59 34.5	2.0	21.7	1.65
18	10 39	16 26 54.34	20 58 39.6	2.0	21.6	1.64
19	10 34	16 26 25.51	20 57 45.4	2.0	21.6	1.64
20	10 30	16 25 57.07	20 56 52.0	2.0	21.6	1.64
21	10 26	16 25 29.04	−20 55 59.4	2.0	21.6	1.64
22	10 21	16 25 1.44	20 55 7.5	2.0	21.5	1.64
23	10 17	16 24 34.30	20 54 16.4	2.0	21.5	1.63
24	10 12	16 24 7.64	20 53 26.3	2.0	21.5	1.63
25	10 8	16 23 41.46	20 52 37.2	2.0	21.4	1.63
26	10 4	16 23 15.78	−20 51 49.2	2.0	21.4	1.63
27	9 59	16 22 50.62	20 51 2.1	2.0	21.4	1.62
28	9 55	16 22 25.98	20 50 16.1	2.0	21.3	1.62
29	9 51	16 22 1.87	20 49 31.3	2.0	21.3	1.62
30	9 46	16 21 38.31	20 48 47.8	2.0	21.3	1.62
July 1	9 42	16 21 15.32	−20 48 5.4	2.0	21.2	1.61
2	9 38	16 20 52.92	20 47 24.2	2.0	21.2	1.61
3	9 34	16 20 31.12	20 46 44.4	2.0	21.2	1.61
4	9 29	16 20 9.92	20 46 6.0	2.0	21.1	1.60
5	9 25	16 19 49.33	20 45 28.9	2.0	21.1	1.60
6	9 21	16 19 29.37	−20 44 53.2	2.0	21.0	1.60
7	9 16	16 19 10.05	20 44 19.0	2.0	21.0	1.59
8	9 12	16 18 51.38	20 43 46.4	1.9	21.0	1.59
9	9 8	16 18 33.38	20 43 15.2	1.9	20.9	1.59
10	9 4	16 18 16.05	20 42 45.6	1.9	20.9	1.58
11	9 0	16 17 59.40	−20 42 17.7	1.9	20.8	1.58
12	8 55	16 17 43.44	20 41 51.5	1.9	20.8	1.58
13	8 51	16 17 28.18	20 41 27.0	1.9	20.7	1.57
14	8 47	16 17 13.63	20 41 4.1	1.9	20.7	1.57
15	8 43	16 16 59.80	20 40 42.9	1.9	20.6	1.56
16	8 39	16 16 46.70	−20 40 23.5	1.9	20.6	1.56
17	8 34	16 16 34.34	−20 40 6.0	1.9	20.5	1.56
July 17	8 34	16 16 34.34	−20 40 6.0	1.9	20.5	1.56
18	8 30	16 16 21.71	20 39 50.2	1.9	20.5	1.55
19	8 26	16 16 11.83	20 39 36.3	1.9	20.4	1.55
20	8 22	16 16 1.69	20 39 24.2	1.9	20.4	1.54
21	8 18	16 15 52.30	20 39 13.9	1.9	20.3	1.54
22	8 14	16 15 43.66	−20 39 5.5	1.9	20.3	1.54
23	8 10	16 15 35.78	20 38 59.0	1.9	20.2	1.53
24	8 6	16 15 28.67	20 38 54.4	1.9	20.2	1.53
25	8 2	16 15 22.31	20 38 51.6	1.9	20.1	1.52
26	7 58	16 15 16.72	20 38 50.7	1.9	20.1	1.52
27	7 54	16 15 11.90	−20 38 51.8	1.9	20.0	1.52
28	7 50	16 15 7.84	20 38 54.8	1.9	19.9	1.51
29	7 46	16 15 4.54	20 38 59.6	1.9	19.9	1.51
30	7 42	16 15 2.01	20 39 6.3	1.8	19.8	1.50
31	7 38	16 15 0.25	20 39 15.0	1.8	19.8	1.50
Aug. 1	7 34	16 14 59.26	−20 39 25.6	1.8	19.7	1.50
2	7 30	16 14 59.03	20 39 38.0	1.8	19.7	1.49
3	7 26	16 14 59.57	20 39 52.3	1.8	19.6	1.49
4	7 22	16 15 0.88	20 40 8.6	1.8	19.6	1.48
5	7 18	16 15 2.96	20 40 26.8	1.8	19.5	1.48
6	7 14	16 15 5.82	−20 40 46.9	1.8	19.4	1.47
7	7 11	16 15 9.45	20 41 8.9	1.8	19.4	1.47
8	7 7	16 15 13.84	20 41 32.8	1.8	19.3	1.46
9	7 3	16 15 18.99	20 41 58.6	1.8	19.3	1.46
10	6 59	16 15 24.90	20 42 26.2	1.8	19.2	1.46
11	6 55	16 15 31.59	−20 42 55.7	1.8	19.1	1.45
12	6 51	16 15 39.04	20 43 27.1	1.8	19.1	1.45
13	6 48	16 15 47.24	20 44 0.3	1.8	19.0	1.44
14	6 44	16 15 56.21	20 44 35.3	1.8	19.0	1.44
15	6 40	16 16 5.94	20 45 12.1	1.8	18.9	1.43
16	6 36	16 16 16.42	−20 45 50.7	1.8	18.9	1.43
17	6 32	16 16 27.65	20 46 31.1	1.7	18.8	1.43
18	6 29	16 16 39.63	20 47 13.2	1.7	18.8	1.42
19	6 25	16 16 52.34	20 47 57.0	1.7	18.7	1.42
20	6 21	16 17 5.78	20 48 42.5	1.7	18.6	1.42
21	6 18	16 17 19.95	−20 49 29.6	1.7	18.6	1.41
22	6 14	16 17 34.84	20 50 18.4	1.7	18.5	1.41
23	6 10	16 17 50.46	20 51 8.7	1.7	18.5	1.40
24	6 7	16 18 6.79	20 52 0.7	1.7	18.4	1.40
25	6 3	16 18 23.83	20 52 54.2	1.7	18.4	1.40
26	5 59	16 18 41.59	−20 53 49.3	1.7	18.3	1.39
27	5 56	16 19 0.04	20 54 45.8	1.7	18.3	1.39
28	5 52	16 19 19.18	20 55 43.7	1.7	18.2	1.38
29	5 49	16 19 39.00	20 56 43.1	1.7	18.2	1.38
30	5 45	16 19 59.51	20 57 43.9	1.7	18.1	1.38
31	5 41	16 20 20.69	−20 58 46.1	1.7	18.0	1.37
Sept. 1	5 38	16 20 42.54	−20 59 49.6	1.7	18.0	1.37

FOR TRANSIT AT WASHINGTON.

Date.	Mean Time of Transit.	Apparent Right Ascension.	Apparent Declination.	Hor. Par.	Semidiam.	S.T. of Sem. Pass. Mer.	Date.	Mean Time of Transit.	Apparent Right Ascension.	Apparent Declination.	Hor. Par.	Semidiam.	S.T. of Sem. Pass. Mer.
	h m	h m s	° ′ ″	″	″	s		h m	h m s	° ′ ″	″	″	s
n. 0	8 10	2 47 9.99	+13 36 41.9	1.0	9.0	0.66	Aug. 16	18 25	4 6 47.36	+18 49 40.9	1.0	8.4	0.63
1	8 6	2 47 3.44	13 36 29.7	1.0	9.0	0.66	17	18 21	4 7 0.17	18 50 5.9	1.0	8.4	0.63
2	8 2	2 46 57.31	13 36 19.5	1.0	9.0	0.66	18	18 17	4 7 12.59	18 50 29.8	1.0	8.4	0.63
3	7 58	2 46 51.60	13 36 11.3	1.0	9.0	0.66	19	18 14	4 7 24.62	18 50 52.5	1.0	8.4	0.63
4	7 54	2 46 46.32	13 36 5.2	1.0	9.0	0.66	20	18 10	4 7 36.24	18 51 13.9	1.0	8.4	0.63
5	7 50	2 46 41.45	+13 36 1.1	1.0	9.0	0.65	21	18 6	4 7 47.45	+18 51 34.2	1.0	8.5	0.63
6	7 46	2 46 37.01	13 35 59.0	1.0	9.0	0.65	22	18 2	4 7 58.26	18 51 53.3	1.0	8.5	0.63
7	7 42	2 46 33.00	13 35 59.0	1.0	9.0	0.65	23	17 59	4 8 8.66	18 52 11.2	1.0	8.5	0.64
8	7 38	2 46 29.42	13 36 0.9	1.0	8.9	0.65	24	17 55	4 8 18.65	18 52 27.8	1.0	8.5	0.64
9	7 34	2 46 26.28	13 36 4.8	1.0	8.9	0.65	25	17 51	4 8 28.22	18 52 43.3	1.0	8.5	0.64
10	7 30	2 46 23.56	+13 36 10.8	1.0	8.9	0.65	26	17 47	4 8 37.38	+18 52 57.6	1.0	8.5	0.64
11	7 26	2 46 21.28	13 36 18.9	1.0	8.9	0.65	27	17 44	4 8 46.12	18 53 10.9	1.0	8.5	0.64
12	7 22	2 46 19.44	13 36 29.0	1.0	8.9	0.65	28	17 40	4 8 54.43	18 53 22.8	1.0	8.6	0.64
13	7 18	2 46 18.04	13 36 41.1	1.0	8.9	0.64	29	17 36	4 9 2.32	18 53 33.5	1.0	8.6	0.64
14	7 14	2 46 17.08	13 36 55.3	1.0	8.8	0.64	30	17 32	4 9 9.79	18 53 43.0	1.0	8.6	0.64
15	7 10	2 46 16.57	+13 37 11.6	1.0	8.8	0.64	31	17 28	4 9 16.82	+18 53 51.3	1.0	8.6	0.65
16	7 6	2 46 16.50	13 37 30.0	1.0	8.8	0.64	Sept. 1	17 25	4 9 23.42	18 53 58.5	1.0	8.6	0.65
17	7 2	2 46 16.87	13 37 50.4	1.0	8.8	0.64	2	17 21	4 9 29.58	18 54 4.4	1.0	8.7	0.65
18	6 58	2 46 17.68	13 38 12.8	1.0	8.8	0.64	3	17 17	4 9 35.30	18 54 9.1	1.0	8.7	0.65
19	6 54	2 46 18.94	13 38 37.2	1.0	8.8	0.64	4	17 13	4 9 40.59	18 54 12.6	1.0	8.7	0.65
20	6 50	2 46 20.64	+13 39 3.6	1.0	8.7	0.64	5	17 9	4 9 45.43	+18 54 14.9	1.0	8.7	0.65
21	6 46	2 46 22.78	13 39 32.1	1.0	8.7	0.63	6	17 5	4 9 49.82	18 54 16.0	1.0	8.7	0.65
22	6 43	2 46 25.37	13 40 2.7	1.0	8.7	0.63	7	17 2	4 9 53.76	18 54 16.0	1.0	8.7	0.65
23	6 39	2 46 28.40	13 40 35.2	1.0	8.7	0.63	8	16 58	4 9 57.25	18 54 14.8	1.0	8.7	0.66
24	6 35	2 46 31.87	13 41 9.7	1.0	8.7	0.63	9	16 54	4 10 0.30	18 54 12.4	1.0	8.8	0.66
25	6 31	2 46 35.79	+13 41 46.2	1.0	8.7	0.63	10	16 50	4 10 2.90	+18 54 8.8	1.0	8.8	0.66
26	6 27	2 46 40.14	13 42 24.6	1.0	8.7	0.63	11	16 46	4 10 5.05	18 54 3.9	1.0	8.8	0.66
27	6 23	2 46 44.92	13 43 5.0	1.0	8.6	0.63	12	16 42	4 10 6.74	18 53 57.9	1.0	8.8	0.66
28	6 19	2 46 50.14	13 43 47.4	1.0	8.6	0.63	13	16 38	4 10 7.98	18 53 50.8	1.0	8.8	0.66
29	6 16	2 46 55.80	13 44 31.6	1.0	8.6	0.62	14	16 34	4 10 8.77	18 53 42.6	1.0	8.8	0.66
30	6 12	2 47 1.89	+13 45 17.7	1.0	8.6	0.62	15	16 30	4 10 9.11	+18 53 33.2	1.0	8.9	0.66
31	6 8	2 47 8.40	13 46 5.7	1.0	8.6	0.62	16	16 26	4 10 8.99	18 53 22.6	1.0	8.9	0.67
b. 1	6 4	2 47 15.34	13 46 55.6	1.0	8.5	0.62	17	16 22	4 10 8.42	18 53 10.9	1.0	8.9	0.67
2	6 0	2 47 22.70	13 47 47.3	1.0	8.5	0.62	18	16 18	4 10 7.40	18 52 58.0	1.0	8.9	0.67
3	5 56	2 47 30.49	13 48 40.9	1.0	8.5	0.62	19	16 14	4 10 5.93	18 52 44.0	1.0	8.9	0.67
4	5 53	2 47 38.70	+13 49 36.2	1.0	8.5	0.62	20	16 10	4 10 4.01	+18 52 28.9	1.0	8.9	0.67
5	5 49	2 47 47.32	13 50 33.3	1.0	8.5	0.62	21	16 6	4 10 1.64	18 52 12.7	1.0	8.9	0.67
6	5 45	2 47 56.36	13 51 32.2	1.0	8.5	0.62	22	16 3	4 9 58.83	18 51 55.3	1.0	8.9	0.67
7	5 41	2 48 5.82	13 52 32.9	1.0	8.5	0.62	23	15 59	4 9 55.57	18 51 36.9	1.0	9.0	0.67
8	5 38	2 48 15.69	13 53 35.3	1.0	8.4	0.62	24	15 55	4 9 51.87	18 51 17.4	1.0	9.0	0.68
9	5 34	2 48 25.96	+13 54 39.3	1.0	8.4	0.62	25	15 51	4 9 47.73	+18 50 56.8	1.0	9.0	0.68
10	5 30	2 48 36.64	13 55 45.2	1.0	8.4	0.62	26	15 47	4 9 43.14	18 50 35.1	1.0	9.0	0.68
11	5 26	2 48 47.73	13 56 52.7	1.0	8.4	0.62	27	15 43	4 9 38.11	18 50 12.3	1.0	9.0	0.68
12	5 22	2 48 59.22	13 58 2.0	1.0	8.4	0.62	28	15 38	4 9 32.64	18 49 48.5	1.0	9.1	0.68
13	5 19	2 49 11.11	13 59 12.9	1.0	8.4	0.61	29	15 34	4 9 26.74	18 49 23.6	1.0	9.1	0.68
14	5 15	2 49 23.40	+14 0 25.4	1.0	8.3	0.61	30	15 30	4 9 20.40	+18 48 57.6	1.0	9.1	0.68
15	5 11	2 49 36.08	+14 1 39.5	1.0	8.3	0.61	Oct. 1	15 26	4 9 13.63	+18 48 30.5	1.0	9.1	0.68

FOR TRANSIT AT WASHINGTON.

Date.	Mean Time of Transit.	Apparent Right Ascension.	Apparent Declination.	Hor. Par.	Semidiam.	S.T. of Sem. Pass. Mer.	Date.	Mean Time of Transit.	Apparent Right Ascension.	Apparent Declination.	Hor. Par.	Semidiam.	S.T. of Sem. Pass. Mer.
	h m	h m s	° ′ ″	″	″	s		h m	h m s	° ′ ″	″	″	s
Oct. 1	15 26	4 9 13.63	+18 48 30.5	1.0	9.1	0.68	Nov. 16	12 14	3 57 47.43	+18 13 14.3	1.1	9.6	0.71
2	15 22	4 9 6.43	18 48 2.4	1.0	9.1	0.68	17	12 10	3 57 27.36	18 12 17.5	1.1	9.6	0.71
3	15 18	4 8 58.80	18 47 33.3	1.0	9.1	0.69	18	12 6	3 57 7.23	18 11 20.7	1.1	9.6	0.71
4	15 14	4 8 50.75	18 47 3.2	1.0	9.1	0.69	19	12 1	3 56 47.05	18 10 23.9	1.1	9.6	0.71
5	15 10	4 8 42.28	18 46 32.1	1.0	9.1	0.69	20	11 57	3 56 26.84	18 9 27.2	1.1	9.6	0.71
6	15 6	4 8 33.39	+18 46 0.0	1.0	9.2	0.69	21	11 53	3 56 6.60	+18 8 30.7	1.1	9.6	0.71
7	15 2	4 8 24.09	18 45 26.8	1.0	9.2	0.69	22	11 49	3 55 46.34	18 7 34.2	1.1	9.6	0.71
8	14 58	4 8 14.37	18 44 52.6	1.0	9.2	0.69	23	11 44	3 55 26.09	18 6 37.8	1.1	9.6	0.71
9	14 54	4 8 4.25	18 44 17.5	1.0	9.2	0.69	24	11 40	3 55 5.87	18 5 41.6	1.1	9.6	0.71
10	14 50	4 7 53.73	18 43 41.5	1.0	9.2	0.70	25	11 36	3 54 45.66	18 4 45.7	1.1	9.6	0.71
11	14 46	4 7 42.82	+18 43 4.6	1.0	9.2	0.70	26	11 31	3 54 25.47	+18 3 50.0	1.1	9.6	0.71
12	14 42	4 7 31.52	18 42 26.7	1.0	9.2	0.70	27	11 27	3 54 5.32	18 2 54.6	1.1	9.6	0.71
13	14 37	4 7 19.83	18 41 47.8	1.0	9.3	0.70	28	11 23	3 53 45.24	18 1 59.5	1.1	9.6	0.71
14	14 33	4 7 7.76	18 41 8.1	1.1	9.3	0.70	29	11 19	3 53 25.22	18 1 4.8	1.1	9.6	0.71
15	14 29	4 6 55.32	18 40 27.6	1.1	9.3	0.70	30	11 14	3 53 5.27	18 0 10.4	1.1	9.5	0.71
16	14 25	4 6 42.52	+18 39 46.2	1.1	9.3	0.70	Dec. 1	11 10	3 52 45.41	+17 59 16.4	1.1	9.5	0.71
17	14 21	4 6 29.36	18 39 4.0	1.1	9.3	0.70	2	11 6	3 52 25.66	17 58 22.9	1.1	9.5	0.71
18	14 17	4 6 15.85	18 38 21.0	1.1	9.3	0.70	3	11 2	3 52 6.02	17 57 30.0	1.1	9.5	0.71
19	14 12	4 6 2.00	18 37 37.2	1.1	9.3	0.70	4	10 57	3 51 46.49	17 56 37.6	1.1	9.5	0.71
20	14 8	4 5 47.82	18 36 52.6	1.1	9.3	0.70	5	10 53	3 51 27.09	17 55 45.8	1.1	9.5	0.71
21	14 4	4 5 33.30	+18 36 7.2	1.1	9.3	0.70	6	10 49	3 51 7.84	+17 54 54.5	1.1	9.5	0.71
22	14 0	4 5 18.46	18 35 21.1	1.1	9.4	0.70	7	10 45	3 50 48.75	17 54 3.9	1.1	9.5	0.71
23	13 56	4 5 3.30	18 34 34.3	1.1	9.4	0.70	8	10 40	3 50 29.83	17 53 13.9	1.1	9.5	0.71
24	13 52	4 4 47.83	18 33 46.8	1.1	9.4	0.70	9	10 36	3 50 11.09	17 52 24.7	1.1	9.5	0.71
25	13 47	4 4 32.07	18 32 58.6	1.1	9.4	0.70	10	10 32	3 49 52.55	17 51 36.3	1.1	9.5	0.71
26	13 43	4 4 16.02	+18 32 9.7	1.1	9.4	0.71	11	10 28	3 49 34.21	+17 50 48.6	1.1	9.5	0.71
27	13 39	4 3 59.69	18 31 20.2	1.1	9.4	0.71	12	10 23	3 49 16.07	17 50 1.6	1.1	9.5	0.71
28	13 35	4 3 43.08	18 30 30.1	1.1	9.4	0.71	13	10 19	3 48 58.15	17 49 15.5	1.1	9.5	0.70
29	13 31	4 3 26.20	18 29 39.5	1.1	9.4	0.71	14	10 15	3 48 40.47	17 48 30.4	1.1	9.5	0.70
30	13 26	4 3 9.06	18 28 48.2	1.1	9.4	0.71	15	10 11	3 48 23.03	17 47 46.2	1.1	9.5	0.70
31	13 22	4 2 51.67	+18 27 56.3	1.1	9.5	0.71	16	10 6	3 48 5.84	+17 47 3.0	1.1	9.5	0.70
Nov. 1	13 18	4 2 34.04	18 27 3.9	1.1	9.5	0.71	17	10 2	3 47 48.91	17 46 20.8	1.1	9.5	0.70
2	13 14	4 2 16.16	18 26 11.1	1.1	9.5	0.71	18	9 58	3 47 32.25	17 45 39.6	1.1	9.4	0.70
3	13 10	4 1 58.06	18 25 17.8	1.1	9.5	0.71	19	9 54	3 47 15.87	17 44 59.3	1.1	9.4	0.70
4	13 5	4 1 39.76	18 24 24.0	1.1	9.5	0.71	20	9 50	3 46 59.77	17 44 20.1	1.1	9.4	0.70
5	13 1	4 1 21.26	+18 23 29.7	1.1	9.5	0.71	21	9 46	3 46 43.96	+17 43 42.0	1.1	9.4	0.70
6	12 57	4 1 2.56	18 22 35.0	1.1	9.5	0.71	22	9 41	3 46 28.46	17 43 5.0	1.1	9.4	0.70
7	12 52	4 0 43.68	18 21 40.0	1.1	9.5	0.71	23	9 37	3 46 13.27	17 42 29.1	1.1	9.4	0.70
8	12 48	4 0 24.63	18 20 44.8	1.1	9.5	0.71	24	9 33	3 45 58.39	17 41 54.3	1.1	9.4	0.70
9	12 44	4 0 5.42	18 19 49.2	1.1	9.5	0.71	25	9 29	3 45 43.84	17 41 20.7	1.1	9.4	0.70
10	12 40	3 59 46.05	+18 18 53.3	1.1	9.5	0.71	26	9 25	3 45 29.63	+17 40 48.3	1.1	9.3	0.70
11	12 36	3 59 26.55	18 17 57.2	1.1	9.5	0.71	27	9 20	3 45 15.75	17 40 17.2	1.1	9.3	0.70
12	12 31	3 59 6.93	18 17 0.9	1.1	9.5	0.71	28	9 16	3 45 2.22	17 39 47.3	1.1	9.3	0.70
13	12 27	3 58 47.20	18 16 4.4	1.1	9.5	0.71	29	9 12	3 44 49.04	17 39 18.6	1.1	9.3	0.69
14	12 23	3 58 27.36	18 15 7.8	1.1	9.6	0.71	30	9 8	3 44 36.22	17 38 51.2	1.1	9.3	0.69
15	12 18	3 58 7.43	+18 14 11.1	1.1	9.6	0.71	31	9 4	3 44 23.76	+17 38 25.2	1.1	9.3	0.69
16	12 14	3 57 47.43	+18 13 14.3	1.1	9.6	0.71	32	9 0	3 44 11.70	+17 38 0.6	1.1	9.3	0.69

FOR TRANSIT AT WASHINGTON.

Date.	Mean Time of Transit.	Apparent Right Ascension.	Apparent Declination.	Hor. Par.	Semidiam.	S.T. of Sem. Pass. Mer.
	h m	h m s	° ′ ″	″	″	s
pr. 21	18 23	20 23 12.08	−19 57 53.5	0.5	1.7	0.12
22	18 19	20 23 15.26	19 57 44.9	0.5	1.7	0.12
23	18 15	20 23 18.23	19 57 36.9	0.5	1.7	0.12
24	18 11	20 23 21.00	19 57 29.7	0.5	1.7	0.12
25	18 7	20 23 23.56	19 57 23.2	0.5	1.7	0.12
26	18 3	20 23 25.92	−19 57 17.4	0.5	1.7	0.12
27	17 59	20 23 28.08	19 57 12.3	0.5	1.7	0.12
28	17 55	20 23 30.04	19 57 7.8	0.5	1.7	0.12
29	17 51	20 23 31.79	19 57 4.0	0.5	1.7	0.12
30	17 48	20 23 33.34	19 57 1.0	0.5	1.7	0.12
ay 1	17 44	20 23 34.68	−19 56 58.7	0.5	1.7	0.12
2	17 40	20 23 35.81	19 56 57.0	0.5	1.7	0.12
3	17 36	20 23 36.73	19 56 56.1	0.5	1.7	0.12
4	17 32	20 23 37.45	19 56 55.8	0.5	1.7	0.12
5	17 28	20 23 37.97	19 56 56.2	0.5	1.7	0.12
6	17 24	20 23 38.29	−19 56 57.2	0.5	1.7	0.12
7	17 20	20 23 38.40	19 56 58.9	0.5	1.7	0.12
8	17 16	20 23 38.30	19 57 1.3	0.5	1.7	0.12
9	17 12	20 23 38.01	19 57 4.5	0.5	1.7	0.12
10	17 8	20 23 37.52	19 57 8.4	0.5	1.7	0.12
11	17 4	20 23 36.81	−19 57 13.0	0.5	1.7	0.12
12	17 0	20 23 35.90	19 57 18.2	0.5	1.7	0.12
13	16 56	20 23 34.79	19 57 24.1	0.5	1.7	0.12
14	16 52	20 23 33.48	19 57 30.6	0.5	1.7	0.12
15	16 48	20 23 31.96	19 57 37.9	0.5	1.7	0.12
16	16 44	20 23 30.24	−19 57 45.8	0.5	1.7	0.12
17	16 41	20 23 28.32	19 57 54.3	0.5	1.7	0.12
18	16 37	20 23 26.21	19 58 3.5	0.5	1.7	0.12
19	16 33	20 23 23.91	19 58 13.3	0.5	1.7	0.12
20	16 29	20 23 21.41	19 58 23.8	0.5	1.7	0.12
21	16 25	20 23 18.71	−19 58 35.0	0.5	1.7	0.12
22	16 21	20 23 15.81	19 58 46.8	0.5	1.7	0.12
23	16 17	20 23 12.73	19 58 59.3	0.5	1.7	0.12
24	16 13	20 23 9.46	19 59 12.4	0.5	1.7	0.12
25	16 9	20 23 6.00	19 59 26.1	0.5	1.7	0.12
26	16 5	20 23 2.35	−19 59 40.2	0.5	1.7	0.12
27	16 1	20 22 58.52	19 59 55.0	0.5	1.7	0.12
28	15 57	20 22 54.51	20 0 10.5	0.5	1.7	0.12
29	15 53	20 22 50.32	20 0 26.6	0.5	1.7	0.12
30	15 49	20 22 45.95	20 0 43.3	0.5	1.7	0.12
31	15 45	20 22 41.39	−20 1 0.5	0.5	1.8	0.12
ne 1	15 41	20 22 36.66	20 1 18.3	0.5	1.8	0.12
2	15 37	20 22 31.77	20 1 36.7	0.5	1.8	0.12
3	15 33	20 22 26.71	20 1 55.5	0.5	1.8	0.12
4	15 29	20 22 21.47	20 2 14.9	0.5	1.8	0.12
5	15 25	20 22 16.06	−20 2 34.9	0.5	1.8	0.12
6	15 21	20 22 10.48	−20 2 55.5	0.5	1.8	0.12
June 6	15 21	20 22 10.48	−20 2 55.5	0.5	1.8	0.12
7	15 17	20 22 4.73	20 3 16.5	0.5	1.8	0.12
8	15 13	20 21 58.83	20 3 38.0	0.5	1.8	0.12
9	15 9	20 21 52.77	20 4 0.1	0.5	1.8	0.13
10	15 5	20 21 46.55	20 4 22.6	0.5	1.8	0.13
11	15 0	20 21 40.17	−20 4 45.5	0.5	1.8	0.13
12	14 56	20 21 33.63	20 5 9.0	0.5	1.8	0.13
13	14 52	20 21 26.95	20 5 32.9	0.5	1.8	0.13
14	14 48	20 21 20.12	20 5 57.3	0.5	1.8	0.13
15	14 44	20 21 13.15	20 6 22.1	0.5	1.8	0.13
16	14 40	20 21 6.04	−20 6 47.4	0.5	1.8	0.13
17	14 36	20 20 58.79	20 7 13.1	0.5	1.8	0.13
18	14 32	20 20 51.40	20 7 39.1	0.5	1.8	0.13
19	14 28	20 20 43.88	20 8 5.5	0.5	1.8	0.13
20	14 24	20 20 36.23	20 8 32.4	0.5	1.8	0.13
21	14 20	20 20 28.45	−20 8 59.6	0.5	1.8	0.13
22	14 16	20 20 20.55	20 9 27.1	0.5	1.8	0.13
23	14 12	20 20 12.53	20 9 55.0	0.5	1.8	0.13
24	14 8	20 20 4.39	20 10 23.3	0.5	1.8	0.13
25	14 4	20 19 56.15	20 10 51.9	0.5	1.8	0.13
26	14 0	20 19 47.80	−20 11 20.7	0.5	1.8	0.13
27	13 56	20 19 39.34	20 11 49.8	0.5	1.8	0.13
28	13 52	20 19 30.78	20 12 19.3	0.5	1.8	0.13
29	13 47	20 19 22.12	20 12 49.1	0.5	1.8	0.13
30	13 43	20 19 13.36	20 13 19.1	0.5	1.8	0.13
July 1	13 39	20 19 4.52	−20 13 49.2	0.5	1.8	0.13
2	13 35	20 18 55.58	20 14 19.6	0.5	1.8	0.13
3	13 31	20 18 46.56	20 14 50.3	0.5	1.8	0.13
4	13 27	20 18 37.45	20 15 21.2	0.5	1.8	0.13
5	13 23	20 18 28.26	20 15 52.3	0.5	1.8	0.13
6	13 19	20 18 18.99	−20 16 23.6	0.5	1.8	0.13
7	13 15	20 18 9.65	20 16 55.1	0.5	1.8	0.13
8	13 11	20 18 0.24	20 17 26.7	0.5	1.8	0.13
9	13 7	20 17 50.76	20 17 58.3	0.5	1.8	0.13
10	13 2	20 17 41.22	20 18 30.1	0.5	1.8	0.13
11	12 58	20 17 31.63	−20 19 2.1	0.5	1.8	0.13
12	12 54	20 17 21.98	20 19 34.2	0.5	1.8	0.13
13	12 50	20 17 12.28	20 20 6.4	0.5	1.8	0.13
14	12 46	20 17 2.54	20 20 38.7	0.5	1.8	0.13
15	12 42	20 16 52.76	20 21 11.0	0.5	1.8	0.13
16	12 38	20 16 42.95	−20 21 43.3	0.5	1.8	0.13
17	12 34	20 16 33.10	20 22 15.7	0.5	1.8	0.13
18	12 30	20 16 23.23	20 22 48.1	0.5	1.8	0.13
19	12 26	20 16 13.33	20 23 20.5	0.5	1.8	0.13
20	12 22	20 16 3.41	20 23 53.0	0.5	1.8	0.13
21	12 18	20 15 53.47	−20 24 25.4	0.5	1.8	0.13
22	12 13	20 15 43.52	−20 24 57.7	0.5	1.8	0.13

URANUS, 1912.

FOR TRANSIT AT WASHINGTON.

Date.	Mean Time of Transit.	Apparent Right Ascension.	Apparent Declination.	Hor. Par.	Semidiam.	S.T. of Sem. Pass. Mer.
	h m	h m s	° ′ ″	″	″	s
July 22	12 13	20 15 43.52	−20 24 57.7	0.5	1.8	0.13
23	12 9	20 15 33.57	20 25 30.0	0.5	1.8	0.13
24	12 5	20 15 23.62	20 26 2.2	0.5	1.8	0.13
25	12 1	20 15 13.66	20 26 34.4	0.5	1.8	0.13
26	11 57	20 15 3.71	20 27 6.5	0.5	1.8	0.13
27	11 53	20 14 53.76	−20 27 38.5	0.5	1.8	0.13
28	11 49	20 14 43.83	20 28 10.4	0.5	1.8	0.13
29	11 45	20 14 33.91	20 28 42.1	0.5	1.8	0.13
30	11 41	20 14 24.02	20 29 13.7	0.5	1.8	0.13
31	11 36	20 14 14.15	20 29 45.2	0.5	1.8	0.13
Aug. 1	11 32	20 14 4.31	−20 30 16.4	0.5	1.8	0.13
2	11 28	20 13 54.49	20 30 47.5	0.5	1.8	0.13
3	11 24	20 13 44.71	20 31 18.5	0.5	1.8	0.13
4	11 20	20 13 34.97	20 31 49.2	0.5	1.8	0.13
5	11 16	20 13 25.28	20 32 19.7	0.5	1.8	0.13
6	11 12	20 13 15.63	−20 32 50.0	0.5	1.8	0.13
7	11 8	20 13 6.03	20 33 20.1	0.5	1.8	0.13
8	11 4	20 12 56.49	20 33 50.0	0.5	1.8	0.13
9	11 0	20 12 47.01	20 34 19.6	0.5	1.8	0.13
10	10 56	20 12 37.60	20 34 48.9	0.5	1.8	0.13
11	10 52	20 12 28.26	−20 35 17.9	0.5	1.8	0.13
12	10 47	20 12 18.99	20 35 46.6	0.5	1.8	0.13
13	10 43	20 12 9.79	20 36 15.0	0.5	1.8	0.13
14	10 39	20 12 0.67	20 36 43.2	0.5	1.8	0.13
15	10 35	20 11 51.63	20 37 11.0	0.5	1.8	0.13
16	10 31	20 11 42.69	−20 37 38.5	0.5	1.8	0.13
17	10 27	20 11 33.84	20 38 5.6	0.5	1.8	0.13
18	10 23	20 11 25.08	20 38 32.3	0.5	1.8	0.13
19	10 19	20 11 16.42	20 38 58.6	0.5	1.8	0.13
20	10 15	20 11 7.87	20 39 24.6	0.5	1.8	0.13
21	10 11	20 10 59.42	−20 39 50.2	0.5	1.8	0.13
22	10 7	20 10 51.07	20 40 15.5	0.5	1.8	0.13
23	10 3	20 10 42.84	20 40 40.3	0.5	1.8	0.13
24	9 58	20 10 34.73	20 41 4.7	0.5	1.8	0.13
25	9 54	20 10 26.74	20 41 28.7	0.5	1.8	0.13
26	9 50	20 10 18.88	−20 41 52.3	0.5	1.8	0.13
27	9 46	20 10 11.14	20 42 15.4	0.5	1.8	0.13
28	9 42	20 10 3.53	20 42 38.1	0.5	1.8	0.13
29	9 38	20 9 56.05	20 43 0.3	0.5	1.8	0.13
30	9 34	20 9 48.70	20 43 22.1	0.5	1.8	0.13
31	9 30	20 9 41.49	−20 43 43.3	0.5	1.8	0.13
Sept. 1	9 26	20 9 34.42	20 44 4.1	0.5	1.8	0.13
2	9 22	20 9 27.50	20 44 24.4	0.5	1.8	0.13
3	9 18	20 9 20.72	20 44 44.3	0.5	1.8	0.13
4	9 14	20 9 14.09	20 45 3.6	0.5	1.8	0.13
5	9 10	20 9 7.62	−20 45 22.3	0.5	1.8	0.13
6	9 6	20 9 1.30	−20 45 40.6	0.5	1.8	0.13
Sept. 6	9 6	20 9 1.30	−20 45 40.6	0.5	1.8	0.13
7	9 2	20 8 55.13	20 45 58.4	0.5	1.8	0.13
8	8 58	20 8 49.14	20 46 15.6	0.5	1.8	0.13
9	8 54	20 8 43.31	20 46 32.3	0.5	1.8	0.13
10	8 50	20 8 37.64	20 46 48.4	0.5	1.7	0.13
11	8 46	20 8 32.14	−20 47 4.0	0.5	1.7	0.13
12	8 42	20 8 26.82	20 47 19.1	0.5	1.7	0.13
13	8 38	20 8 21.68	20 47 33.6	0.5	1.7	0.12
14	8 34	20 8 16.71	20 47 47.5	0.5	1.7	0.12
15	8 30	20 8 11.92	20 48 0.9	0.5	1.7	0.12
16	8 26	20 8 7.30	−20 48 13.7	0.5	1.7	0.12
17	8 22	20 8 2.87	20 48 25.9	0.5	1.7	0.12
18	8 18	20 7 58.63	20 48 37.6	0.5	1.7	0.12
19	8 14	20 7 54.58	20 48 48.6	0.5	1.7	0.12
20	8 10	20 7 50.73	20 48 59.0	0.5	1.7	0.12
21	8 6	20 7 47.07	−20 49 8.8	0.5	1.7	0.12
22	8 2	20 7 43.58	20 49 18.0	0.5	1.7	0.12
23	7 58	20 7 40.28	20 49 26.6	0.5	1.7	0.12
24	7 54	20 7 37.18	20 49 34.5	0.5	1.7	0.12
25	7 50	20 7 34.28	20 49 41.8	0.5	1.7	0.12
26	7 46	20 7 31.57	−20 49 48.6	0.5	1.7	0.12
27	7 42	20 7 29.07	20 49 54.8	0.5	1.7	0.12
28	7 38	20 7 26.77	20 50 0.4	0.5	1.7	0.12
29	7 34	20 7 24.67	20 50 5.3	0.5	1.7	0.12
30	7 30	20 7 22.77	20 50 9.6	0.5	1.7	0.12
Oct. 1	7 26	20 7 21.07	−20 50 13.3	0.5	1.7	0.12
2	7 22	20 7 19.58	20 50 16.4	0.5	1.7	0.12
3	7 18	20 7 18.30	20 50 18.8	0.5	1.7	0.12
4	7 14	20 7 17.22	20 50 20.6	0.5	1.7	0.12
5	7 10	20 7 16.35	20 50 21.8	0.5	1.7	0.12
6	7 6	20 7 15.69	−20 50 22.4	0.5	1.7	0.12
7	7 2	20 7 15.24	20 50 22.3	0.5	1.7	0.12
8	6 58	20 7 15.01	20 50 21.6	0.5	1.7	0.12
9	6 54	20 7 14.98	20 50 20.2	0.5	1.7	0.12
10	6 50	20 7 15.16	20 50 18.2	0.5	1.7	0.12
11	6 46	20 7 15.56	−20 50 15.5	0.5	1.7	0.12
12	6 43	20 7 16.17	20 50 12.2	0.5	1.7	0.12
13	6 39	20 7 16.99	20 50 8.2	0.5	1.7	0.12
14	6 35	20 7 18.03	20 50 3.5	0.5	1.7	0.12
15	6 31	20 7 19.28	20 49 58.2	0.5	1.7	0.12
16	6 27	20 7 20.74	−20 49 52.2	0.5	1.7	0.12
17	6 23	20 7 22.41	20 49 45.7	0.5	1.7	0.12
18	6 19	20 7 24.31	20 49 38.5	0.5	1.7	0.12
19	6 15	20 7 26.42	20 49 30.6	0.5	1.7	0.12
20	6 11	20 7 28.73	20 49 22.1	0.5	1.7	0.12
21	6 7	20 7 31.26	−20 49 13.0	0.5	1.7	0.12
22	6 4	20 7 34.00	−20 49 3.3	0.5	1.7	0.12

FOR TRANSIT AT WASHINGTON.

Date.	Mean Time of Transit.	Apparent Right Ascension.	Apparent Declination.	Hor. Par.	Semidiam.	S.T. of Sem. Pass. Mer.
	h m	h m s	° ′ ″	″	″	s
Jan. 0	13 0	7 37 52.79	+20 57 23.5	0.3	1.3	0.09
1	12 56	7 37 45.87	20 57 40.1	0.3	1.3	0.09
2	12 52	7 37 38.91	20 57 56.7	0.3	1.3	0.09
3	12 48	7 37 31.91	20 58 13.4	0.3	1.3	0.09
4	12 44	7 37 24.89	20 58 30.2	0.3	1.3	0.09
5	12 39	7 37 17.85	+20 58 47.1	0.3	1.3	0.09
6	12 35	7 37 10.79	20 59 4.0	0.3	1.3	0.09
7	12 31	7 37 3.70	20 59 21.0	0.3	1.3	0.09
8	12 27	7 36 56.60	20 59 38.0	0.3	1.3	0.09
9	12 23	7 36 49.48	20 59 55.1	0.3	1.3	0.09
10	12 19	7 36 42.35	+21 0 12.2	0.3	1.3	0.09
11	12 15	7 36 35.20	21 0 29.4	0.3	1.3	0.09
12	12 11	7 36 28.05	21 0 46.5	0.3	1.3	0.09
13	12 7	7 36 20.89	21 1 3.7	0.3	1.3	0.09
14	12 3	7 36 13.74	21 1 20.9	0.3	1.3	0.09
15	11 59	7 36 6.60	+21 1 38.1	0.3	1.3	0.09
16	11 55	7 35 59.46	21 1 55.3	0.3	1.3	0.09
17	11 51	7 35 52.33	21 2 12.4	0.3	1.3	0.09
18	11 47	7 35 45.20	21 2 29.5	0.3	1.3	0.09
19	11 43	7 35 38.09	21 2 46.6	0.3	1.3	0.09
20	11 39	7 35 31.00	+21 3 3.8	0.3	1.3	0.09
21	11 35	7 35 23.93	21 3 20.8	0.3	1.3	0.09
22	11 31	7 35 16.88	21 3 37.7	0.3	1.3	0.09
23	11 27	7 35 9.86	21 3 54.6	0.3	1.3	0.09
24	11 22	7 35 2.87	21 4 11.4	0.3	1.3	0.09
25	11 18	7 34 55.91	+21 4 28.2	0.3	1.3	0.09
26	11 14	7 34 48.98	21 4 44.9	0.3	1.3	0.09
27	11 10	7 34 42.10	21 5 1.5	0.3	1.3	0.09
28	11 6	7 34 35.26	21 5 18.0	0.3	1.3	0.09
29	11 2	7 34 28.46	21 5 34.4	0.3	1.3	0.09
30	10 58	7 34 21.71	+21 5 50.7	0.3	1.3	0.09
31	10 54	7 34 15.01	21 6 6.9	0.3	1.3	0.09
Feb. 1	10 50	7 34 8.35	21 6 23.0	0.3	1.3	0.09
2	10 46	7 34 1.75	21 6 39.0	0.3	1.3	0.09
3	10 42	7 33 55.21	21 6 54.8	0.3	1.3	0.09
4	10 38	7 33 48.73	+21 7 10.5	0.3	1.3	0.09
5	10 34	7 33 42.31	21 7 26.1	0.3	1.3	0.09
6	10 30	7 33 35.95	21 7 41.6	0.3	1.3	0.09
7	10 26	7 33 29.66	21 7 56.9	0.3	1.3	0.09
8	10 22	7 33 23.44	21 8 12.0	0.3	1.3	0.09
9	10 18	7 33 17.29	+21 8 26.9	0.3	1.3	0.09
10	10 14	7 33 11.22	21 8 41.7	0.3	1.3	0.09
11	10 10	7 33 5.22	21 8 56.3	0.3	1.3	0.09
12	10 6	7 32 59.29	21 9 10.8	0.3	1.3	0.09
13	10 2	7 32 53.45	21 9 25.1	0.3	1.3	0.09
14	9 58	7 32 47.69	+21 9 39.2	0.3	1.3	0.09
15	9 54	7 32 42.02	+21 9 53.1	0.3	1.3	0.09
Feb. 15	9 54	7 32 42.02	+21 9 53.1	0.3	1.3	0.09
16	9 50	7 32 36.44	21 10 6.9	0.3	1.3	0.09
17	9 46	7 32 30.96	21 10 20.5	0.3	1.3	0.09
18	9 42	7 32 25.57	21 10 33.8	0.3	1.3	0.09
19	9 38	7 32 20.26	21 10 46.9	0.3	1.3	0.09
20	9 34	7 32 15.05	+21 10 59.9	0.3	1.3	0.09
21	9 30	7 32 9.95	21 11 12.6	0.3	1.3	0.09
22	9 26	7 32 4.95	21 11 25.1	0.3	1.3	0.09
23	9 22	7 32 0.06	21 11 37.3	0.3	1.3	0.09
24	9 18	7 31 55.27	21 11 49.3	0.3	1.3	0.09
25	9 14	7 31 50.59	+21 12 1.1	0.3	1.3	0.09
26	9 10	7 31 46.02	21 12 12.7	0.3	1.3	0.09
27	9 6	7 31 41.56	21 12 24.1	0.3	1.3	0.09
28	9 2	7 31 37.20	21 12 35.2	0.3	1.3	0.09
29	8 58	7 31 32.96	21 12 46.1	0.3	1.3	0.09
Mar. 1	8 54	7 31 28.83	+21 12 56.7	0.3	1.3	0.09
2	8 50	7 31 24.82	21 13 7.0	0.3	1.3	0.09
3	8 46	7 31 20.93	21 13 17.1	0.3	1.3	0.09
4	8 42	7 31 17.16	21 13 26.9	0.3	1.3	0.09
5	8 38	7 31 13.51	21 13 36.5	0.3	1.3	0.09
6	8 34	7 31 9.98	+21 13 45.8	0.3	1.3	0.09
7	8 30	7 31 6.58	21 13 54.9	0.3	1.3	0.09
8	8 26	7 31 3.31	21 14 3.7	0.3	1.3	0.09
9	8 22	7 31 0.17	21 14 12.2	0.3	1.3	0.09
10	8 18	7 30 57.15	21 14 20.4	0.3	1.3	0.09
11	8 14	7 30 54.25	+21 14 28.3	0.3	1.3	0.09
12	8 10	7 30 51.49	21 14 36.0	0.3	1.3	0.09
13	8 6	7 30 48.85	21 14 43.4	0.3	1.3	0.09
14	8 2	7 30 46.35	21 14 50.6	0.3	1.3	0.09
15	7 58	7 30 43.98	21 14 57.5	0.3	1.3	0.09
16	7 54	7 30 41.75	+21 15 4.1	0.3	1.3	0.09
17	7 50	7 30 39.65	21 15 10.4	0.3	1.3	0.09
18	7 46	7 30 37.69	21 15 16.4	0.3	1.3	0.09
19	7 42	7 30 35.86	21 15 22.1	0.3	1.3	0.09
20	7 38	7 30 34.18	21 15 27.5	0.3	1.3	0.09
21	7 34	7 30 32.64	+21 15 32.6	0.3	1.3	0.09
22	7 30	7 30 31.23	21 15 37.4	0.3	1.3	0.09
23	7 26	7 30 29.95	21 15 41.9	0.3	1.3	0.09
24	7 22	7 30 28.82	21 15 46.1	0.3	1.3	0.09
25	7 18	7 30 27.83	21 15 50.0	0.3	1.3	0.09
26	7 14	7 30 26.99	+21 15 53.7	0.3	1.3	0.09
27	7 10	7 30 26.29	21 15 57.0	0.3	1.3	0.09
28	7 6	7 30 25.72	21 16 0.0	0.3	1.3	0.09
29	7 2	7 30 25.30	21 16 2.7	0.3	1.3	0.09
30	6 58	7 30 25.02	21 16 5.1	0.3	1.3	0.09
31	6 54	7 30 24.88	+21 16 7.1	0.3	1.3	0.09
Apr. 1	6 50	7 30 24.88	+21 16 8.8	0.3	1.3	0.09

NEPTUNE, 1912.

FOR TRANSIT AT WASHINGTON.

Date.	Mean Time of Transit.	Apparent Right Ascension.	Apparent Declination.	Hor. Par.	Semidiam.	S.T. of Sem. Pass. Mer.
	h m	h m s	° ′ ″	″	″	s
Apr. 1	6 50	7 30 24.88	+21 16 8.8	0.3	1.3	0.09
2	6 47	7 30 25.02	21 16 10.3	0.3	1.3	0.09
3	6 43	7 30 25.31	21 16 11.6	0.3	1.3	0.09
4	6 39	7 30 25.74	21 16 12.5	0.3	1.3	0.09
5	6 35	7 30 26.31	21 16 13.0	0.3	1.3	0.09
6	6 31	7 30 27.02	+21 16 13.2	0.3	1.3	0.09
7	6 27	7 30 27.87	21 16 13.1	0.3	1.3	0.09
8	6 23	7 30 28.86	21 16 12.8	0.3	1.3	0.09
9	6 19	7 30 29.99	21 16 12.1	0.3	1.3	0.09
10	6 15	7 30 31.26	21 16 11.1	0.3	1.3	0.09
11	6 11	7 30 32.67	+21 16 9.8	0.3	1.3	0.09
12	6 7	7 30 34.23	21 16 8.1	0.3	1.3	0.09
13	6 4	7 30 35.94	21 16 6.1	0.3	1.3	0.09
14	6 0	7 30 37.77	21 16 3.8	0.3	1.3	0.09
15	5 56	7 30 39.74	21 16 1.3	0.3	1.3	0.09
Oct. 16	18 9	7 51 29.61	+20 27 39.7	0.3	1.3	0.09
17	18 5	7 51 31.26	20 27 35.0	0.3	1.3	0.09
18	18 1	7 51 32.77	20 27 30.6	0.3	1.3	0.09
19	17 57	7 51 34.14	20 27 26.5	0.3	1.3	0.09
20	17 54	7 51 35.37	20 27 22.8	0.3	1.3	0.09
21	17 50	7 51 36.45	+20 27 19.4	0.3	1.3	0.09
22	17 46	7 51 37.39	20 27 16.4	0.3	1.3	0.09
23	17 42	7 51 38.19	20 27 13.8	0.3	1.3	0.09
24	17 38	7 51 38.85	20 27 11.6	0.3	1.3	0.09
25	17 34	7 51 39.37	20 27 9.9	0.3	1.3	0.09
26	17 30	7 51 39.74	+20 27 8.5	0.3	1.3	0.09
27	17 26	7 51 39.98	20 27 7.5	0.3	1.3	0.09
28	17 22	7 51 40.08	20 27 6.9	0.3	1.3	0.09
29	17 18	7 51 40.03	20 27 6.6	0.3	1.3	0.09
30	17 14	7 51 39.84	20 27 6.6	0.3	1.3	0.09
31	17 10	7 51 39.51	+20 27 7.0	0.3	1.3	0.09
Nov. 1	17 6	7 51 39.03	20 27 7.8	0.3	1.3	0.09
2	17 2	7 51 38.41	20 27 9.1	0.3	1.3	0.09
3	16 58	7 51 37.64	20 27 10.8	0.3	1.3	0.09
4	16 54	7 51 36.73	20 27 12.8	0.3	1.3	0.09
5	16 51	7 51 35.69	+20 27 15.1	0.3	1.3	0.09
6	16 47	7 51 34.51	20 27 17.8	0.3	1.3	0.09
7	16 43	7 51 33.18	20 27 20.8	0.3	1.3	0.09
8	16 39	7 51 31.72	20 27 24.2	0.3	1.3	0.09
9	16 35	7 51 30.12	20 27 28.1	0.3	1.3	0.09
10	16 31	7 51 28.38	+20 27 32.5	0.3	1.3	0.09
11	16 27	7 51 26.50	20 27 37.2	0.3	1.3	0.09
12	16 23	7 51 24.49	20 27 42.2	0.3	1.3	0.09
13	16 19	7 51 22.35	20 27 47.6	0.3	1.3	0.09
14	16 15	7 51 20.07	20 27 53.3	0.3	1.3	0.09
15	16 11	7 51 17.65	+20 27 59.4	0.3	1.3	0.09
16	16 7	7 51 15.10	+20 28 5.8	0.3	1.3	0.09
Nov. 16	16 7	7 51 15.10	+20 28 5.8	0.3		
17	16 3	7 51 12.43	20 28 12.6	0.3		
18	15 59	7 51 9.64	20 28 19.8	0.3		
19	15 55	7 51 6.71	20 28 27.2	0.3		
20	15 51	7 51 3.64	20 28 35.0	0.3		
21	15 47	7 51 0.44	+20 28 43.2	0.3		
22	15 43	7 50 57.12	20 28 51.9	0.3		
23	15 39	7 50 53.68	20 29 0.8	0.3		
24	15 35	7 50 50.12	20 29 10.0	0.3		
25	15 31	7 50 46.43	20 29 19.5	0.3		
26	15 27	7 50 42.61	+20 29 29.4	0.3		
27	15 23	7 50 38.67	20 29 39.6	0.3		
28	15 19	7 50 34.62	20 29 50.1	0.3		
29	15 15	7 50 30.46	20 30 0.9	0.3		
30	15 11	7 50 26.18	20 30 12.0	0.3		
Dec. 1	15 7	7 50 21.79	+20 30 23.4	0.3		
2	15 3	7 50 17.29	20 30 35.1	0.3		
3	14 59	7 50 12.68	20 30 47.1	0.3		
4	14 55	7 50 7.97	20 30 59.5	0.3		
5	14 51	7 50 3.14	20 31 12.2	0.3		
6	14 47	7 49 58.21	+20 31 25.1	0.3		
7	14 43	7 49 53.18	20 31 38.2	0.3		
8	14 39	7 49 48.04	20 31 51.5	0.3		
9	14 35	7 49 42.80	20 32 5.2	0.3		
10	14 31	7 49 37.47	20 32 19.1	0.3		
11	14 27	7 49 32.05	+20 32 33.3	0.3		
12	14 23	7 49 26.54	20 32 47.8	0.3		
13	14 19	7 49 20.93	20 33 2.5	0.3		
14	14 15	7 49 15.24	20 33 17.4	0.3		
15	14 11	7 49 9.46	20 33 32.5	0.3		
16	14 7	7 49 3.60	+20 33 47.9	0.3		
17	14 3	7 48 57.66	20 34 3.5	0.3		
18	13 59	7 48 51.64	20 34 19.3	0.3		
19	13 55	7 48 45.55	20 34 35.3	0.3		
20	13 51	7 48 39.40	20 34 51.4	0.3		
21	13 47	7 48 33.18	+20 35 7.6	0.3		
22	13 43	7 48 26.88	20 35 24.0	0.3		
23	13 39	7 48 20.52	20 35 40.7	0.3		
24	13 35	7 48 14.09	20 35 57.7	0.3		
25	13 30	7 48 7.60	20 36 14.9	0.3		
26	13 26	7 48 1.06	+20 36 32.1	0.3		
27	13 22	7 47 54.46	20 36 49.4	0.3		
28	13 18	7 47 47.82	20 37 6.8	0.3		
29	13 14	7 47 41.12	20 37 24.3	0.3		
30	13 10	7 47 34.37	20 37 41.9	0.3		
31	13 6	7 47 27.58	+20 37 59.7	0.3		
32	13 2	7 47 20.75	+20 38 17.7	0.3		

PART III.

PHENOMENA.

ECLIPSES, 1912.

In the year 1912 there will be four eclipses, two of the Sun and two of the Moon.

I.—*A Partial Eclipse of the Moon*, 1912, April 1, invisible at Washington; the beginning visible generally in Europe, Africa, Asia, except the extreme northeastern portion, central and western Australia, and eastern South America; the ending visible generally in South America except the northwest portion, Europe, Africa, central and western Asia, and western Australia.

ELEMENTS OF THE ECLIPSE.

Greenwich mean time of ☍ in right ascension, April 1d 9h 19m 53.6s

	h m s		s
Sun's right ascension	0 43 19.58	Hourly motion	9.10
Moon's right ascension	12 43 19.58	Hourly motion	122.17
	° ′ ″		′ ″
Sun's declination	4 39 39.5 N.	Hourly motion	0 57.8 N.
Moon's declination	3 39 4.2 S.	Hourly motion	16 20.6 S.
Sun's equa. hor. parallax	8.8	Sun's true semidiameter	15 59.8
Moon's equa. hor. parallax	58 21.7	Moon's true semidiameter	15 53.4

CIRCUMSTANCES OF THE ECLIPSE.

		d h m	
Moon enters penumbra	April	1 7 54.4	Greenwich Mean Time.
Moon enters shadow		1 9 25.7	
Middle of the eclipse		1 10 14.0	
Moon leaves shadow		1 11 2.3	
Moon leaves penumbra		1 12 33.7	

Contacts of Shadow with Moon's limb.	Angles of position from the north point.	The Moon being in the zenith in longitude from Greenwich.	and in latitude.
	°	° ′	° ′
First	177 to W.	39 31 E.	3 41 S.
Last	125 to W.	16 7 E.	4 7 S.

Magnitude of the eclipse = 0.187 (Moon's diameter = 1.0).

II.—*A Central Eclipse of the Sun*, 1912, April 16–17, visible at Washington as a partial eclipse, the Sun rising eclipsed. The central eclipse will be total for about thirty-two minutes at the middle of its duration. For the rest of its duration it will be annular.

ELEMENTS OF THE ECLIPSE.

Greenwich mean time of ☌ in right ascension, April 17d 0h 3m 27.1s

	h m s		s s
Sun and Moon's R. A.	1 40 36.50	Hourly motion	9.27 and 123.43
	° ′ ″		′ ″
Sun's declination	10 26 51.2 N.	Hourly motion	0 52.8 N.
Moon's declination	11 0 47.9 N.	Hourly motion	15 0.8 N.
Sun's equa. hor. parallax	8.8	Sun's true semidiameter	15 55.5
Moon's equa. hor. parallax	57 41.4	Moon's true semidiameter	15 42.3

CIRCUMSTANCES OF THE ECLIPSE.

		Greenwich Mean Time.	Longitude from Greenwich.	Latitude.
		d h m	° ′	° ′
Eclipse begins	April	16 20 53.7	42 13.7 W.	6 48.2 S.
Central eclipse begins		16 22 0.7	61 11.4 W.	5 3.5 N.
Central eclipse changes from annular to total		16 23 18.9	15 36.2 W.	33 50.4 N.
Central eclipse changes from total to annular		16 23 58.1	3 9.4 W.	45 24.7 N.
Central eclipse at local apparent noon		17 0 3.5	0 57.6 W.	46 52.9 N.
Central eclipse ends		17 1 7.3	89 48.4 E.	57 19.8 N.
Eclipse ends		17 2 14.3	67 18.6 E.	45 52.1 N.

III.—*A Partial Eclipse of the Moon*, 1912, September 25–26, the Moon setting at Vashington as the eclipse begins; the beginning visible generally in North America xcept the extreme eastern portion, the Pacific Ocean, eastern Asia, and Australia; he ending visible in central and western North America, the Pacific Ocean, Australia, entral and eastern Asia.

ELEMENTS OF THE ECLIPSE.

Greenwich mean time of ☍ in right ascension, September 25ᵈ 22ʰ 44ᵐ 33ˢ.4

Sun's right ascension	12ʰ 10ᵐ 52ˢ.81	Hourly motion	9ˢ.00
Moon's right ascension	0 10 52.81	Hourly motion	108.99
Sun's declination	1° 10′ 46″.3 S.	Hourly motion	0′ 58″.5 S.
Moon's declination	0 11 49.8 N.	Hourly motion	14 52.3 N.
Sun's equa. hor. parallax	8.8	Sun's true semidiameter	15 57.6
Moon's equa. hor. parallax	55 15.8	Moon's true semidiameter	15 2.8

CIRCUMSTANCES OF THE ECLIPSE.

		d	h	m	
Moon enters penumbra	September	25	21	15.3	Greenwich Mean Time.
Moon enters shadow		25	23	3.1	
Middle of the eclipse		25	23	44.7	
Moon leaves shadow		26	0	26.3	
Moon leaves penumbra		26	2	13.7	

Contacts of Shadow with Moon's limb.	Angles of position from the north point.	The Moon being in the zenith in longitude from Greenwich.	and in latitude.
	°	° ′	° ′
First	8 to W.	167 51 W.	0 16 N.
Last	50 to W.	171 55 E.	0 37 N.

Magnitude of the eclipse = 0.122 (Moon's diameter = 1.0).

IV.—*A Total Eclipse of the Sun*, 1912, October 9–10, invisible at Washington.

ELEMENTS OF THE ECLIPSE.

Greenwich mean time of ☌ in right ascension October 10ᵈ 1ʰ 59ᵐ 47ˢ.8

Sun and Moon's R. A.	13ʰ 2ᵐ 15ˢ.76	Hourly motions	9ˢ.20 and 127ˢ.01
Sun's declination	6° 38′ 25″.5 S.	Hourly motion	0′ 56″.9 S.
Moon's declination	7 6 15.2 S.	Hourly motion	16 37.2 S.
Sun's equa. hor. parallax	8.8	Sun's true semidiameter	16 1.4
Moon's equa. hor. parallax	59 14.7	Moon's true semidiameter	16 7.9

CIRCUMSTANCES OF THE ECLIPSE.

		Greenwich Mean Time. d h m	Longitude from Greenwich. ° ′	Latitude. ° ′
Eclipse begins	October	9 22 57.0	75 59.2 W.	12 39.9 N.
Central eclipse begins		9 23 58.7	92 28.6 W.	3 43.1 N.
Central eclipse at local apparent noon		10 1 59.8	33 11.2 W.	34 56.9 S.
Central eclipse ends		10 3 13.0	47 14.5 E.	52 28.1 S.
Eclipse ends		10 4 14.9	29 25.9 E.	43 37.6 S.

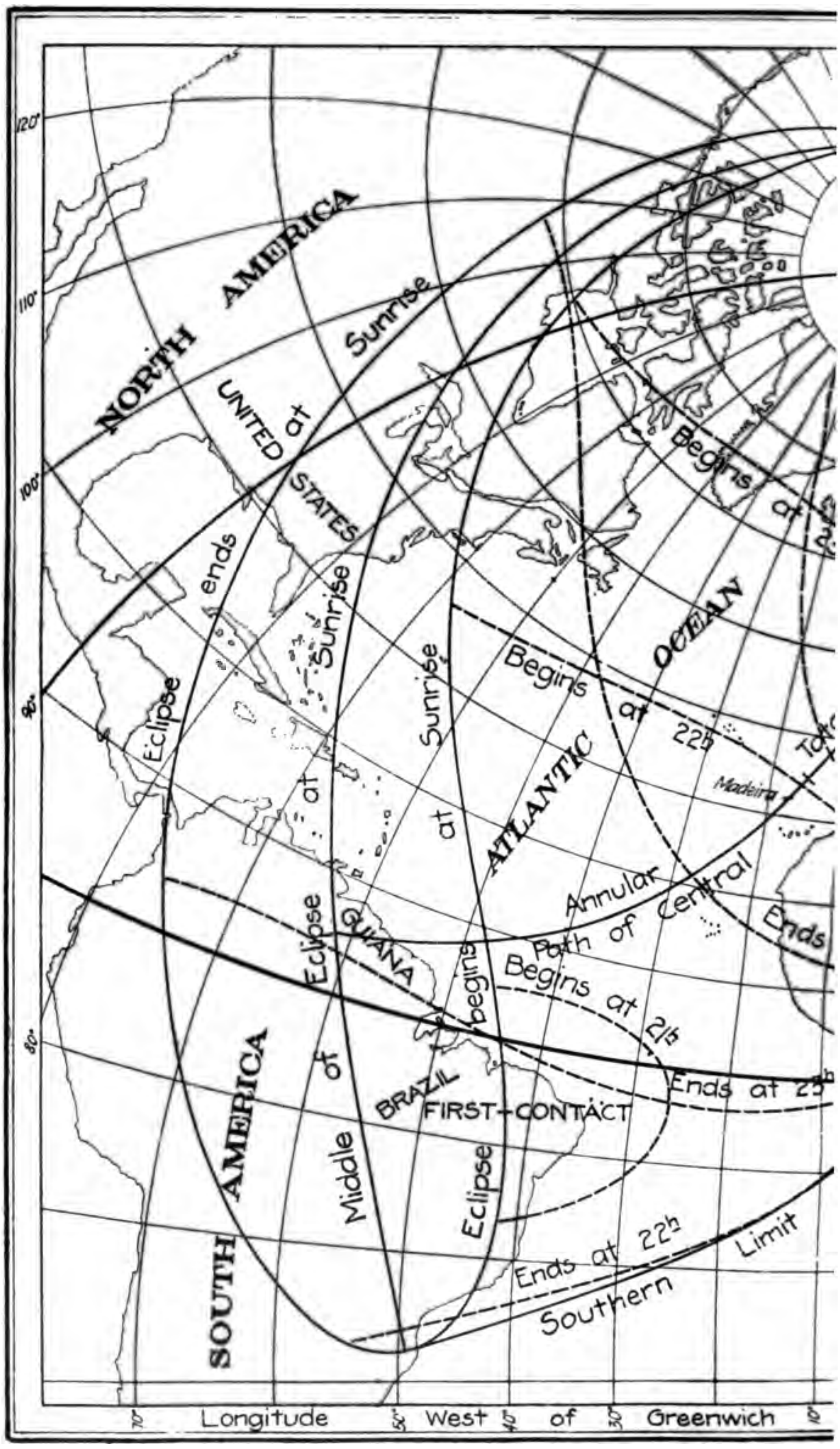
The regions within which the eclipses of the Sun are visible are laid down on the ccompanying charts; from which, by means of the dotted lines, the Greenwich ean times of beginning and ending at any place may be found with an uncertainty hich will vary from three or four minutes for a high Sun, to fifteen or twenty inutes when the Sun is near the horizon.

BESSELIAN ELEMENTS OF THE CENTRAL ECLIPSE OF THE SUN, 1912, APRIL 16–17.

Greenwich Mean Time.	Coordinates of Center of Shadow on Fundamental Plane.		Direction of Axis of Shadow.			Radius of Penumbra and Shadow on Fundamental Plane.	
	x	y	Log sin d	Log cos d	μ	l_1	l_2
h m					° ′		
20 50	−1.56892	−0.20034	+9.25655	+9.99280	312 35.0	+0.55004	+0.00410
21 0	−1.48787	−0.15937	+9.25665	+9.99280	315 5.1	+0.55003	+0.00409
10	1.40680	0.11842	9.25675	9.99280	317 35.1	0.55002	0.00408
20	1.32574	0.07747	9.25684	9.99280	320 5.2	0.55001	0.00407
30	1.24466	−0.03652	9.25694	9.99279	322 35.2	0.54999	0.00405
40	1.16358	+0.00442	9.25704	9.99279	325 5.2	0.54998	0.00404
50	1.08250	0.04537	9.25713	9.99279	327 35.3	0.54997	0.00403
22 0	−1.00141	+0.08631	+9.25723	+9.99278	330 5.3	+0.54995	+0.00401
10	0.92032	0.12725	9.25733	9.99278	332 35.4	0.54994	0.00400
20	0.83922	0.16818	9.25742	9.99278	335 5.4	0.54992	0.00398
30	0.75811	0.20911	9.25752	9.99277	337 35.4	0.54990	0.00397
40	0.67700	0.25004	9.25762	9.99277	340 5.5	0.54989	0.00395
50	0.59589	0.29096	9.25771	9.99277	342 35.5	0.54987	0.00393
23 0	−0.51478	+0.33188	+9.25781	+9.99276	345 5.5	+0.54985	+0.00391
10	0.43366	0.37279	9.25791	9.99276	347 35.6	0.54983	0.00390
20	0.35254	0.41369	9.25800	9.99276	350 5.6	0.54981	0.00388
30	0.27141	0.45460	9.25810	9.99275	352 35.6	0.54979	0.00386
40	0.19028	0.49551	9.25820	9.99275	355 5.7	0.54977	0.00384
50	0.10914	0.53641	9.25829	9.99275	357 35.7	0.54975	0.00381
0 0	−0.02801	+0.57731	+9.25839	+9.99274	0 5.8	+0.54973	+0.00379
10	+0.05313	0.61820	9.25849	9.99274	2 35.8	0.54971	0.00377
20	0.13428	0.65908	9.25858	9.99274	5 5.8	0.54968	0.00375
30	0.21542	0.69996	9.25868	9.99273	7 35.9	0.54966	0.00373
40	0.29657	0.74084	9.25878	9.99273	10 5.9	0.54963	0.00370
50	0.37771	0.78171	9.25887	9.99273	12 35.9	0.54961	0.00368
1 0	+0.45886	+0.82258	+9.25897	+9.99272	15 6.0	+0.54958	+0.00365
10	0.54002	0.86344	9.25906	9.99272	17 36.0	0.54956	0.00362
20	0.62117	0.90430	9.25916	9.99272	20 6.0	0.54953	0.00360
30	0.70233	0.94515	9.25926	9.99271	22 36.1	0.54950	0.00357
40	0.78348	0.98600	9.25935	9.99271	25 6.1	0.54948	0.00354
50	0.86464	1.02684	9.25945	9.99271	27 36.1	0.54945	0.00351
2 0	+0.94580	+1.06768	+9.25955	+9.99270	30 6.2	+0.54942	+0.00348
10	1.02695	1.10851	9.25964	9.99270	32 36.2	0.54939	0.00345
20	+1.10811	+1.14933	+9.25974	+9.99270	35 6.2	+0.54936	+0.00342

Greenwich Mean Time.	Log x' for 1 Minute.	Log y' for 1 Minute.	Log μ' for 1 Minute.	Log Tangents of Angles of Cones.	
				Penumbra.	Shadow.
h m					
20 0	+7.9086	+7.6125	+1.1762	+7.66802	+7.66585
21 0	7.9088	7.6124	1.1762	7.66802	7.66585
22 0	7.9090	7.6122	1.1762	7.66801	7.66584
23 0	7.9092	7.6120	1.1762	7.66800	7.66584
0 0	7.9093	7.6117	1.1762	7.66800	7.66583
1 0	7.9094	7.6114	1.1762	7.66799	7.66582
2 0	7.9094	7.6111	1.1762	7.66799	7.66582
3 0	+7.9094	+7.6107	+1.1762	+7.66798	+7.66581

CENTRAL ECLIPS



Note:-The hours of beginning an

PATH OF THE SHADOW DURING THE TOTAL ECLIPSE OF THE SUN, 1912, OCTOBER 9–10.

Greenwich Mean Time.	Northern Limit of Shadow Path.		Central Line.		Southern Limit of Shadow Path.		Duration of Totality on Central Line.
	Latitude.	Longitude from Greenwich.	Latitude.	Longitude from Greenwich.	Latitude.	Longitude from Greenwich.	
	° ′	° ′	° ′	° ′	° ′	° ′	m s
Limits.	+ 3 53.1	92 25.6 W.	+ 3 43.1	92 28.6 W.	+ 3 37.3	92 30.8 W.	. . .
0h 0m	2 29.4	83 53.5	+ 2 24.9	84 25.3	+ 2 20.8	84 58.1	0 36.5
5	+ 0 6.9	75 13.4	− 0 0.8	75 35.3	− 0 8.3	75 57.2	0 50.7
10	− 1 49.1	70 16.6	1 58.2	70 37.0	2 7.1	70 57.5	1 0.0
15	3 35.8	66 35.7	3 45.8	66 55.8	3 55.6	67 16.0	1 7.6
20	5 17.1	63 37.0	5 27.8	63 56.8	5 38.3	64 16.7	1 14.1
25	6 54.8	61 5.2	7 6.0	61 25.0	7 17.0	61 44.9	1 19.9
30	− 8 29.9	58 52.5	− 8 41.6	59 12.3	− 8 53.1	59 32.2	1 25.0
35	10 2.9	56 53.8	10 15.0	57 13.7	10 26.9	57 33.7	1 29.7
40	11 34.5	55 6.2	11 46.9	55 26.1	11 59.1	55 46.1	1 33.8
45	13 4.7	53 26.9	13 17.4	53 46.8	13 30.0	54 6.9	1 37.5
50	14 33.9	51 54.1	14 46.9	52 14.1	14 59.8	52 34.2	1 40.9
55	16 2.2	50 26.5	16 15.5	50 46.5	16 28.7	51 6.6	1 43.8
1 0	−17 29.9	49 2.8	−17 43.4	49 22.9	−17 56.9	49 43.0	1 46.4
5	18 57.0	47 42.4	19 10.8	48 2.4	19 24.6	48 22.5	1 48.6
10	20 23.7	46 24.1	20 37.7	46 44.1	20 51.8	47 4.1	1 50.6
15	21 50.0	45 7.2	22 4.3	45 27.1	22 18.7	45 47.1	1 52.2
20	23 16.1	43 51.1	23 30.6	44 10.9	23 45.2	44 30.7	1 53.3
25	24 42.0	42 35.2	24 56.8	42 54.8	25 11.6	43 14.4	1 54.2
30	−26 7.8	41 18.6	−26 22.8	41 38.1	−26 38.0	41 57.5	1 54.7
35	27 33.5	40 0.9	27 48.9	40 20.1	28 4.3	40 39.3	1 54.9
40	28 59.2	38 41.4	29 14.9	39 0.3	29 30.6	39 19.2	1 54.7
45	30 25.1	37 19.4	30 41.1	37 37.9	30 57.1	37 56.4	1 54.2
50	31 51.1	35 54.2	32 7.3	36 12.2	32 23.6	36 30.2	1 53.3
55	33 17.3	34 24.7	33 33.7	34 42.2	33 50.4	34 59.7	1 52.1
2 0	−34 43.6	32 50.1	−35 0.4	33 7.2	−35 17.3	33 24.0	1 50.6
5	36 10.2	31 9.6	36 27.2	31 26.0	36 44.4	31 42.2	1 48.6
10	37 37.0	29 21.9	37 54.3	29 37.6	38 11.7	29 52.9	1 46.3
15	39 4.0	27 25.7	39 21.6	27 40.4	39 39.2	27 54.7	1 43.6
20	40 31.3	25 19.2	40 49.1	25 32.8	41 6.9	25 45.9	1 40.6
25	41 58.6	23 0.2	42 16.5	23 12.5	42 34.6	23 24.3	1 37.2
30	−43 26.0	20 26.3	−43 44.1	20 37.1	−44 2.3	20 47.3	1 33.3
35	44 53.1	17 34.3	45 11.3	17 43.2	45 29.6	17 51.5	1 28.9
40	46 19.9	14 19.8	46 38.1	14 26.6	46 56.4	14 32.6	1 24.2
45	47 45.7	10 36.8	48 3.7	10 40.9	48 21.8	10 44.2	1 18.8
50	49 9.6	6 16.9	49 27.3	6 17.7	49 45.2	6 17.7	1 13.0
55	50 30.8	1 7.1 W.	50 47.9	1 3.9 W.	51 5.0	0 59.9 W.	1 6.3
3 0	−51 46.3	5 14.0 E.	−52 2.4	5 22.3 E.	−52 18.6	5 31.4 E.	0 58.8
5	52 51.4	13 30.7	53 5.6	13 46.1	53 20.0	14 2.8	0 49.9
10	53 30.2	25 54.7	53 40.9	26 22.9	53 51.3	26 52.3	0 38.1
Limits.	−52 26.1	47 12.3 E.	−52 28.1	47 14.5 E.	−52 38.9	47 19.1 E.	. . .

THE EQUINOXES AND SOLSTICES, THE MOON'S PHASES, LIBRATIONS, ETC., IN ASTRONOMICAL TIME AND DATE OF THE 90TH MERIDIAN WEST FROM GREENWICH.

To convert Astronomical time and date into Civil time and date, affix P. M. in case the number of hours is less than twelve. When the number of hours is greater than twelve, subtract twelve hours, add one to the number of days, and affix A. M.

Vernal Equinox Mar. 20^d 5^h 29^m. Autumnal Equinox Sept. 22^d 16^h 8^m.
Summer Solstice June 21^d 1^h 17^m. Winter Solstice Dec. 21^d 10^h 45^m.

PHASES OF THE MOON.

New Moon.				First Quarter.				Full Moon.				Last Quarter.			
	d	h	m		d	h	m		d	h	m		d	h	m
January	18	17	10.0	January	26	14	51.4	January	3	19	29.7	January	10	13	42.9
February	17	11	44.2	February	25	1	26.7	February	2	5	58.0	February	9	6	50.8
March	18	4	8.7	March	25	9	1.9	March	2	16	42.0	March	10	1	55.6
April	16	17	40.1	April	23	14	47.2	April	1	4	4.5	April	8	21	23.8
May	16	4	13.5	May	22	20	11.3	April	30	16	19.4	May	8	15	56.0
June	14	12	23.6	June	21	2	38.9	May	30	5	29.5	June	7	8	35.6
July	13	19	13.2	July	20	11	18.5	June	28	19	33.8	July	6	22	46.9
August	12	1	57.6	August	18	22	56.6	July	28	10	28.2	August	5	10	17.6
September	10	9	48.5	September	17	13	54.8	August	27	1	58.8	September	3	19	23.1
October	9	19	40.6	October	17	8	6.2	September	25	17	34.2	October	3	2	48.1
November	8	8	4.8	November	16	4	43.3	October	25	8	30.5	November	1	9	37.5
December	7	23	6.6	December	16	2	6.5	November	23	22	12.2	November	30	17	4.8
								December	23	10	30.1	December	30	2	11.9

APOGEE, PERIGEE, AND GREATEST LIBRATION.

Apogee.			Perigee.			Greatest Libration.							
	d	h		d	h		d	h			d	h	
January	17	7.9	January	3	19.7	January	25	23.8	E.	January	9	20.4	W.
February	13	17.0	February	1	8.3	February	22	14.3	E.	February	7	4.6	W.
March	12	10.7	February	29	15.0	March	19	22.5	E.	March	6	9.0	W.
April	9	6.8	March	28	3.0	April	15	14.3	E.	April	3	3.8	W.
May	7	2.0	April	22	4.3	May	13	3.1	E.	April	30	4.5	W.
June	3	18.8	May	18	22.7	June	10	2.4	E.	May	26	10.8	W.
July	1	6.6	June	15	22.5	July	8	6.3	E.	June	22	13.3	W.
July	28	10.8	July	14	5.9	August	5	10.6	E.	July	20	11.0	W.
August	24	14.6	August	11	15.6	September	2	9.3	E.	August	17	15.0	W.
September	21	2.3	September	8	23.9	September	29	11.6	E.	September	14	19.4	W.
October	18	20.0	October	7	0.8	October	25	16.0	E.	October	12	19.6	W.
November	15	16.5	November	2	16.9	November	21	18.3	E.	November	9	8.6	W.
December	13	13.3	November	27	16.8	December	19	15.1	E.	December	5	21.8	W.
			December	25	8.8								

FORMULÆ FOR THE LIBRATION OF THE MOON.

Let I = the inclination of the Moon's equator to the ecliptic ($=1°\ 28'.8$).
Ω = the mean longitude of the Moon's ascending node, or the mean longitude of the descending node of the Moon's equator.
C = the angle at the center of the Moon's disk made by a lunar meridian with the circle of declination, counted from north to east on the apparent disk.
$\lambda, \beta, \alpha, \delta$ = the apparent long., lat., right ascension, and decl. of the Moon, corrected for parallax.
λ' = the selenocentric long. of the Earth, counted on the Moon's equator from descending node, Ω.
$i, \Delta, \Omega', ☾$ = the quantities defined on page 212, where their values are given.

The Moon's libration in longitude and latitude may then be found for any time by means of the following formulæ, in connection with the tables given on pages 212 and 213:

$$\mu = -0'.574 \sin 2(\Omega - \lambda) \qquad \lambda' = \lambda + \mu + Ab$$

$$A = \sin I \cos(\Omega - \lambda) \qquad \text{The libration in latitude} = b = B - \beta$$

$$\tan B = \tan I \sin(\Omega - \lambda) \qquad \text{The libration in longitude} = l = \lambda' - ☾$$

$$\sin C = \sin i \, \frac{\cos(\lambda' + \Delta - \Omega)}{\cos \delta} = -\sin i \, \frac{\cos(\alpha - \Omega')}{\cos b}$$

[Eph 12]

MEAN PLACES FOR 1912.0. (January 0^d.764, Washington.)

Name of Star.	Magnitude.	Right Ascension.	Annual Proper Motion.	Declination.	Annual Proper Motion.
		h m s	s	° ′ ″	″
80 B. Piscium	6.3	0 0 33.128	+ 0.0037	− 0 59 29.73	− 0.052
4 Ceti	6.3	0 3 13.621	+ 0.0018	3 2 18.60	+ 0.009
5 Ceti	6.3	0 3 41.730	+ 0.0003	− 2 56 13.74	+ 0.014
98 B. Piscium	6.3	0 13 16.453	+ 0.0051	+ 1 11 58.45	+ 0.012
44 Piscium	6.0	0 20 53.465	− 0.0014	1 27 8.50	− 0.023
147 B. Piscium	5.9	0 43 45.851	+ 0.0483	+ 4 49 42.51	− 1.132
155 B. Piscium	6.5	0 46 46.352	+ 0.0011	2 54 27.09	− 0.094
171 B. Piscium	6.3	0 55 15.864	+ 0.0008	6 0 31.43	− 0.005
ε Piscium	4.4	0 58 22.474	− 0.0054	7 24 59.64	+ 0.026
73 Piscium	6.2	1 0 19.010	+ 0.0022	5 11 5.47	− 0.008
77 Piscium	6.4	1 1 15.950	+ 0.0011	+ 4 26 24.29	− 0.114
e Piscium	5.6	1 3 50.094	− 0.0180	5 11 4.45	− 0.171
ζ Piscium	5.6	1 9 7.938	+ 0.0096	7 6 36.94	− 0.052
88 Piscium	6.2	1 10 7.659	− 0.0011	6 31 47.70	− 0.026
263 B. Piscium	6.4	1 23 45.664	+ 0.0027	7 30 20.43	+ 0.008
π Piscium	5.6	1 32 25.868	− 0.0049	+11 41 30.01	+ 0.034
54 Ceti	6.0	1 46 11.670	− 0.0048	10 36 28.61	− 0.027
26 B. Arietis	6.0	1 54 43.054	− 0.0003	11 52 6.42	− 0.029
12 H^1. Arietis	6.3	1 57 50.734	− 0.0009	13 3 9.71	− 0.006
19 Arietis	5.8	2 8 15.154	+ 0.0071	14 52 4.28	− 0.021
27 Arietis	6.4	2 26 1.382	+ 0.0029	+17 18 54.32	− 0.089
36 Arietis	6.5	2 39 24.322	+ 0.0036	17 23 30.69	− 0.040
40 Arietis	6.0	2 43 35.890	+ 0.0030	17 55 2.06	− 0.020
π Arietis	5.2	2 44 22.745	+ 0.0004	17 5 55.76	− 0.011
45 Arietis	6.0	2 50 51.602	− 0.0011	17 58 32.54	− 0.006
ρ Arietis	5.6	2 51 27.933	+ 0.0196	+17 40 22.05	− 0.208
47 Arietis	5.8	2 53 2.820	+ 0.0160	20 18 59.33	− 0.021
ε Arietis (*mean*)	4.6	2 54 10.609	− 0.0009	20 59 20.11	− 0.010
54 Arietis	6.5	3 3 21.615	+ 0.0018	18 27 28.44	− 0.014
δ Arietis	4.5	3 6 35.658	+ 0.0110	19 23 40.42	+ 0.001
ζ Arietis	5.0	3 9 50.413	− 0.0019	+20 43 7.95	− 0.082
τ Arietis	5.1	3 16 8.632	+ 0.0023	20 49 49.49	− 0.033
Arietis	5.2	3 17 41.193	− 0.0032	20 25 40.83	− 0.009
65 Arietis	6.0	3 19 21.506	+ 0.0006	20 29 30.66	− 0.008
66 Arietis	6.1	3 23 17.762	+ 0.0006	22 30 4.69	− 0.112
14 H^1. Tauri	6.5	3 33 53.497	. . . .	+20 37 46.63	. . .
16 Tauri	5.4	3 39 34.156	+ 0.0009	24 0 47.82	− 0.049
17 Tauri	3.8	3 39 38.812	+ 0.0016	23 50 14.36	− 0.050
18 Tauri	5.6	3 39 54.483	+ 0.0004	24 33 50.10	− 0.038
q Tauri	4.3	3 39 57.969	+ 0.0010	24 11 31.20	− 0.034
20 Tauri	4.1	3 40 35.250	+ 0.0016	+24 5 36.49	− 0.044
21 Tauri	5.8	3 40 39.718	+ 0.0012	24 16 49.77	− 0.046
22 Tauri	6.5	3 40 48.162	+ 0.0006	24 15 14.53	− 0.039
23 Tauri	4.3	3 41 6.015	+ 0.0017	23 40 29.39	− 0.050
η Tauri	3.0	3 42 15.036	+ 0.0016	23 50 1.34	− 0.050
104 B. Tauri	5.5	3 43 8.050	+ 0.0008	+23 9 5.51	− 0.045
27 Tauri	3.7	3 43 55.601	+ 0.0013	23 47 6.12	− 0.048
28 Tauri	5.2	3 43 56.883	+ 0.0009	23 52 6.75	− 0.046
133 B. Tauri	5.9	3 44 44.578	+ 0.0026	21 58 37.52	− 0.042
32 Tauri	5.8	3 51 39.896	+ 0.0045	22 13 30.72	− 0.112
33 Tauri	6.0	3 51 50.706	+ 0.0026	+22 55 14.90	− 0.009
161 B. Tauri	6.5	3 55 43.296	+ 0.0027	22 57 12.79	− 0.052
36 Tauri	5.6	3 59 5.724	+ 0.0001	23 51 51.52	− 0.022
p Tauri	5.6	4 5 28.132	− 0.0024	+26 15 7.32	− 0.04

MEAN PLACES FOR 1912.0. (January 0^d.764, Washington.)

Name of Star.	Magnitude.	Right Ascension.	Annual Proper Motion.	Declination.	Annual Proper Motion.
		h m s	s	° ′ ″	″
χ Tauri . . .	5.3	4 17 13.516	+ 0.0028	+25 25 20.45	− 0.029
62 Tauri . . .	6.1	4 18 41.293	+ 0.0008	24 5 48.07	− 0.019
17 B. Aurigæ . . .	6.0	4 47 17.188	+ 0.0033	27 45 3.61	− 0.037
38 B. Aurigæ . . .	6.5	4 59 7.703	− 0.0001	27 34 25.87	− 0.075
47 B. Aurigæ . . .	6.0	5 4 13.342	. . . .	27 55 12.73	. . .
354 B. Tauri . . .	6.4	5 15 27.674	− 0.0027	+27 52 7.97	− 0.015
22 Aurigæ . . .	6.4	5 17 48.401	+ 0.0017	28 51 13.29	− 0.031
β Tauri . . .	1.8	5 20 43.679	+ 0.0025	28 32 2.38	− 0.177
107 B. Aurigæ . . .	6.5	5 30 24.114	− 0.0013	27 36 20.07	− 0.076
112 B. Aurigæ . . .	5.7	5 31 38.995	− 0.0004	26 52 12.06	− 0.040
116 B. Aurigæ . . .	5.9	5 33 42.533	+ 0.0012	+29 9 55.09	− 0.010
406 B. Tauri . . .	5.6	5 45 25.308	− 0.0013	27 56 32.71	+ 0.011
136 Tauri . . .	4.6	5 47 47.797	+ 0.0013	27 35 32.11	− 0.020
154 B. Aurigæ . . .	6.4	5 50 58.362	. . . .	28 55 44.84	. . .
415 B. Tauri . . .	6.1	5 55 28.740	+ 0.0018	27 34 6.80	− 0.001
183 B. Aurigæ . . .	6.3	6 0 45.367	. . . .	+29 31 12.82	. . .
κ Aurigæ . . .	4.4	6 9 46.300	− 0.0043	29 31 53.02	− 0.263
211 B. Aurigæ . . .	6.3	6 15 34.880	. . . .	29 34 53.86	. . .
49 Aurigæ . . .	5.1	6 29 39.574	− 0.0001	28 5 30.06	− 0.027
53 Aurigæ . . .	5.6	6 32 48.213	− 0.0019	29 3 38.15	− 0.022
54 Aurigæ . . .	5.8	6 34 0.186	− 0.0012	+28 20 29.82	− 0.025
28 Geminorum . .	5.5	6 39 10.962	− 0.0001	29 3 38.85	− 0.026
47 Geminorum . .	5.6	7 5 55.705	− 0.0011	27 0 6.82	− 0.051
53 Geminorum . .	5.9	7 10 27.517	− 0.0008	28 3 4.75	− 0.001
134 B. Geminorum . .	6.5	7 11 36.433	+ 0.0058	26 50 55.62	− 0.134
59 Geminorum . .	5.7	7 19 5.018	+ 0.0010	+27 48 31.80	+ 0.014
ι Geminorum . .	3.9	7 20 15.787	− 0.0086	27 58 25.69	− 0.088
b^1 Geminorum . .	5.0	7 23 51.604	− 0.0032	28 18 1.06	− 0.063
b^2 Geminorum . .	5.0	7 24 20.461	− 0.0019	28 5 54.30	− 0.030
υ Geminorum . .	4.3	7 30 30.136	− 0.0016	27 5 31.57	− 0.109
ε Geminorum . .	5.5	7 38 44.949	− 0.0017	+25 59 38.90	− 0.028
φ Geminorum . .	5.0	7 48 6.851	− 0.0020	26 59 39.89	− 0.027
ω Cancri . . .	5.9	7 55 36.506	+ 0.0003	25 38 3.97	− 0.004
4 Cancri . . .	6.2	7 56 25.457	− 0.0012	25 19 56.69	+ 0.007
ψ Cancri . . .	5.9	8 5 9.298	− 0.0055	25 46 30.56	− 0.351
λ Cancri . . .	5.9	8 15 18.358	− 0.0011	+24 18 0.36	− 0.028
28 Cancri . . .	6.1	8 23 23.873	− 0.0023	24 26 15.01	− 0.072
$υ^1$ Cancri . . .	5.7	8 26 18.481	− 0.0056	24 22 42.34	− 0.064
$υ^2$ Cancri . . .	6.4	8 27 48.151	− 0.0047	24 23 4.92	− 0.068
γ Cancri . . .	4.7	8 38 11.770	− 0.0071	21 47 8.25	− 0.043
194 B. Cancri (*Second Star*)	6.3	9 2 22.775	− 0.0121	+23 20 5.51	+ 0.016
ξ Cancri . . .	5.2	9 4 18.172	+ 0.0011	22 24 7.24	+ 0.002
79 Cancri . . .	6.1	9 5 17.686	+ 0.0003	22 21 15.31	− 0.005
90 H^1. Cancri . . .	6.1	9 8 35.867	− 0.0007	21 38 46.60	− 0.013
57 B. Leonis . . .	6.5	9 39 36.591	+ 0.0020	19 16 6.70	− 0.077
107 B. Leonis . . .	6.3	10 0 54.649	− 0.0023	+16 11 10.68	+ 0.017
η Leonis . . .	3.6	10 2 32.132	− 0.0022	17 11 31.95	− 0.002
34 Leonis . . .	6.4	10 6 54.430	+ 0.0037	13 47 23.93	− 0.035
37 Leonis . . .	5.5	10 11 57.441	− 0.0013	14 10 3.18	− 0.014
42 Leonis . . .	6.1	10 17 6.509	− 0.0017	15 25 10.24	− 0.027
46 Leonis . . .	5.8	10 27 30.045	− 0.0024	+14 35 21.37	+ 0.021
l Leonis . . .	5.3	10 44 38.003	+ 0.0001	11 0 39.70	− 0.033
ι Leonis . . .	4.7	11 0 28.724	− 0.0234	7 48 43.47	− 0.021
308 B. Leonis . . .	5.8	11 9 27.534	+ 0.0032	+ 8 32 32.50	− 0.125

MEAN PLACES FOR 1912.0. (January 0d.764, Washington.)

Name of Star.	Magnitude.	Right Ascension.	Annual Proper Motion.	Declination.	Annual Proper Motion.
		h m s	s	° ′ ″	″
σ Leonis	4.1	11 16 35.985	− 0.0062	+ 6 30 42.60	− 0.013
89 Leonis	5.7	11 29 51.767	− 0.0121	3 32 56.60	− 0.104
β Virginis	3.8	11 46 6.685	+ 0.0494	2 15 38.58	− 0.275
27 B. Virginis	6.5	11 54 33.325	− 0.0033	1 1 12.25	+ 0.034
b Virginis	5.2	11 55 26.513	− 0.0008	4 8 43.43	− 0.012
10 Virginis	6.2	12 5 10.775	+ 0.0034	+ 2 23 31.41	− 0.181
13 Virginis	5.9	12 14 9.590	+ 0.0019	− 0 17 53.12	− 0.021
η Virginis	4.0	12 15 24.221	− 0.0036	0 10 40.16	− 0.027
319 B. Virginis	6.3	12 43 0.466	− 0.0003	5 49 12.95	− 0.053
38 Virginis	6.1	12 48 40.754	− 0.0173	3 4 29.95	− 0.004
91 G. Virginis	6.5	12 49 5.686	− 0.0025	− 3 44 43.57	− 0.070
g Virginis	5.6	13 3 57.094	− 0.0011	8 30 47.36	− 0.053
θ Virginis	4.4	13 5 23.519	− 0.0029	5 4 9.90	− 0.040
α Virginis	1.2	13 20 33.305	− 0.0028	10 42 7.95	− 0.032
h Virginis	5.4	13 28 19.851	− 0.0025	9 42 42.60	− 0.042
86 Virginis	5.6	13 41 14.833	− 0.0014	−11 59 8.47	+ 0.012
621 B. Virginis	6.4	13 59 40.986	− 0.0030	14 32 56.34	− 0.018
40 H. Virginis	5.1	14 6 1.969	+ 0.0003	15 53 12.10	− 0.014
47 G. Libræ	6.1	15 1 22.368	+ 0.0065	21 46 5.81	− 0.051
ι Libræ (*var.*)	4.3	15 7 12.122	− 0.0031	19 27 33.76	− 0.053
25 Libræ	6.0	15 8 18.251	− 0.0036	−19 18 59.80	− 0.035
64 G. Libræ	5.8	15 11 16.750	− 0.0028	22 4 27.32	+ 0.018
147 B. Libræ	6.2	15 25 30.974	+ 0.0020	20 25 34.41	− 0.029
169 B. Libræ	6.0	15 32 37.468	− 0.0017	22 51 0.49	− 0.068
172 B. Libræ	5.9	15 33 9.021	....	20 43 31.77	...
177 B. Libræ	6.2	15 34 10.630	− 0.0016	−22 51 46.57	− 0.034
42 Libræ	5.0	15 35 4.563	− 0.0018	23 31 57.66	− 0.027
A Scorpii	4.6	15 48 19.520	− 0.0017	25 3 53.67	− 0.023
31 B. Scorpii	5.4	15 48 38.293	− 0.0022	24 16 17.88	− 0.037
32 B. Scorpii	5.3	15 48 41.430	− 0.0023	23 42 58.83	− 0.016
3 Scorpii	5.9	15 49 22.301	− 0.0031	−24 59 0.40	− 0.029
40 B. Scorpii	5.4	15 53 18.020	− 0.0031	24 34 41.04	+ 0.004
48 B. Scorpii	4.9	15 58 1.391	− 0.0048	25 37 14.24	− 0.043
50 B. Scorpii	6.4	15 58 37.524	+ 0.0017	24 29 3.16	− 0.032
57 B. Scorpii	5.7	16 0 51.325	− 0.0011	23 22 0.52	− 0.004
24 G. Scorpii	6.2	16 2 34.859	0.0000	−24 13 37.75	− 0.068
65 B. Scorpii	5.5	16 2 45.703	+ 0.0095	26 5 28.52	+ 0.023
27 G. Scorpii	5.8	16 3 28.348	+ 0.0032	23 27 3.68	− 0.012
41 G. Scorpii	6.3	16 8 27.827	− 0.0004	24 11 51.66	− 0.034
85 B. Scorpii	6.0	16 9 33.317	− 0.0005	25 15 14.97	+ 0.012
19 Scorpii	4.9	16 15 20.287	− 0.0012	−23 57 28.14	− 0.013
σ Scorpii	3.1	16 15 50.214	− 0.0011	25 22 56.69	− 0.039
α Scorpii	1.2	16 24 0.553	− 0.0006	26 14 14.92	− 0.028
22 Scorpii	4.8	16 24 51.549	− 0.0004	24 55 19.42	− 0.016
116 B. Scorpii	6.2	16 25 58.681	− 0.0013	26 20 48.31	− 0.037
134 B. Scorpii	6.4	16 38 49.752	+ 0.0012	−27 17 29.84	− 0.014
118 B. Ophiuchi	6.2	17 1 25.933	− 0.0008	26 23 41.22	− 0.046
95 G. Ophiuchi	6.1	17 6 54.426	+ 0.0008	27 39 14.45	− 0.029
36 Ophiuchi (*First star*)	5.4	17 9 56.019	− 0.0370	26 28 28.34	− 1.169
43 Ophiuchi	5.4	17 17 49.202	− 0.0002	28 3 30.25	− 0.040
163 G. Ophiuchi	6.3	17 37 45.248	+ 0.0002	−27 50 32.64	− 0.017
X Sagittarii (*var.*)	4.4	17 42 1.255	+ 0.0002	27 47 53.03	− 0.015
4 G. Sagittarii	6.2	17 42 57.614	− 0.0004	26 56 40.01	− 0.030
10 G. Sagittarii	5.7	17 51 8.455	+ 0.0024	−28 3 5.53	+ 0.015

MEAN PLACES FOR 1912.0. (January 0d.764, **Washington.**)

Name of Star.			Magnitude.	Right Ascension.	Annual Proper Motion.	Declination.	Annual Proper Motion.
				h m s	s	° ′ ″	″
210	B.	Scorpii	5.8	17 53 4.153	+ 0.0028	−28 44 59.52	+ 0.005
W		Sagittarii (*var.*)	4.3	17 59 23.928	+ 0.0007	29 35 5.09	− 0.015
38	B.	Sagittarii	4.7	18 2 30.562	+ 0.0016	28 28 3.01	− 0.010
		C. D.—28°14268	6.4	18 6 22.578	− 0.0002	28 55 15.79	− 0.019
48	G.	Sagittarii	6.3	18 11 49.145	+ 0.0093	28 19 2.42	− 0.234
62	B.	Sagittarii	6.0	18 11 49.602	+ 0.0053	−28 40 56.17	− 0.032
66	B.	Sagittarii	4.7	18 12 32.689	0.0000	27 4 29.95	+ 0.015
58	G.	Sagittarii	6.1	18 16 26.113	+ 0.0028	28 28 14.48	+ 0.005
φ		Sagittarii	3.3	18 40 9.521	+ 0.0034	27 4 55.31	− 0.006
τ		Sagittarii	3.5	19 1 26.836	− 0.0046	27 47 59.49	− 0.254
183	B.	Sagittarii	6.2	19 1 58.544	+ 0.0024	−28 46 23.32	− 0.009
234	B.	Sagittarii	5.9	19 19 1.065	− 0.0013	28 2 11.22	+ 0.017
248	B.	Sagittarii	5.7	19 24 25.681	+ 0.0017	27 9 57.95	− 0.014
ω		Sagittarii	4.8	19 50 27.040	+ 0.0145	26 32 0.97	+ 0.060
b		Sagittarii	4.6	19 51 32.929	− 0.0002	27 24 14.32	− 0.006
A		Sagittarii	4.9	19 53 35.579	+ 0.0013	−26 26 3.85	+ 0.056
40	B.	Capricorni	6.2	20 27 38.134	+ 0.0003	25 14 30.55	− 0.064
56	B.	Capricorni	6.3	20 34 57.724	+ 0.0376	24 5 45.93	+ 0.462
17		Capricorni	5.8	20 41 4.010	+ 0.0011	21 50 4.00	− 0.014
86	B.	Capricorni	6.2	20 47 51.677	+ 0.0071	24 6 47.97	− 0.048
χ		Capricorni	5.3	21 3 31.327	+ 0.0013	−21 32 51.81	− 0.059
27		Capricorni	6.1	21 4 31.260	+ 0.0085	20 54 36.97	− 0.123
φ		Capricorni	5.3	21 10 37.471	0.0000	21 1 2.87	0.000
33		Capricorni	5.3	21 19 10.266	− 0.0013	21 13 34.69	− 0.122
35		Capricorni	6.0	21 22 15.618	− 0.0016	21 34 40.68	− 0.090
128	B.	Capricorni	6.5	21 25 3.362	+ 0.0019	−19 31 55.59	− 0.027
37		Capricorni	5.7	21 29 54.725	− 0.0016	20 28 37.57	+ 0.025
ε		Capricorni	4.7	21 32 9.302	0.0000	19 51 39.00	0.000
κ		Capricorni	4.8	21 37 44.766	+ 0.0094	19 16 4.21	− 0.006
143	B.	Capricorni	6.1	21 38 18.359	+ 0.0067	20 1 23.72	− 0.039
δ		Capricorni	3.0	21 42 11.127	+ 0.0176	−16 31 37.46	− 0.297
152	B.	Capricorni	6.5	21 45 22.618	− 0.0004	17 15 21.67	− 0.054
154	B.	Capricorni	6.1	21 46 48.708	+ 0.0103	19 2 0.43	+ 0.075
161	B.	Capricorni	6.4	21 57 21.270	+ 0.0060	18 19 35.41	− 0.090
29		Aquarii (*mean*)	6.5	21 57 37.672	+ 0.0008	17 23 20.13	+ 0.009
39		Aquarii	6.2	22 7 41.131	+ 0.0016	−14 37 39.22	− 0.044
45		Aquarii	6.1	22 14 17.466	+ 0.0051	13 44 45.07	− 0.002
50		Aquarii	5.9	22 19 44.343	+ 0.0034	13 58 32.65	+ 0.013
182	B.	Aquarii	6.2	22 25 19.321	+ 0.0129	13 21 58.08	− 0.019
56		Aquarii	6.1	22 25 34.500	+ 0.0022	15 2 8.96	− 0.034
70		Aquarii	6.1	22 43 52.507	+ 0.0035	−11 1 13.44	+ 0.010
74		Aquarii	5.8	22 48 50.790	+ 0.0013	12 5 5.01	0.000
h		Aquarii	5.4	23 0 34.492	+ 0.0081	8 10 7.87	+ 0.016
φ		Aquarii	4.4	23 9 45.914	− 0.0043	6 31 24.93	+ 0.091
ψ^1		Aquarii	4.5	23 11 16.943	+ 0.0250	9 34 1.94	− 0.005
χ		Aquarii	5.3	23 12 17.298	− 0.0015	− 8 12 23.74	− 0.014
ψ^2		Aquarii	4.6	23 13 19.858	+ 0.0012	9 39 46.69	− 0.002
317	B.	Aquarii	6.3	23 16 8.742	− 0.0099	6 23 19.20	− 0.065
337	B.	Aquarii	6.4	23 24 59.134	+ 0.0121	5 0 43.32	− 0.218
342	B.	Aquarii	6.5	23 26 58.827	+ 0.0124	4 34 5.67	− 0.172
20		Piscium	5.6	23 43 25.135	+ 0.0064	− 3 15 3.25	+ 0.002
24		Piscium	6.1	23 48 24.358	+ 0.0051	3 38 39.12	− 0.045
27		Piscium	5.1	23 54 10.077	− 0.0034	4 2 38.93	− 0.066
29		Piscium	5.1	23 57 18.844	+ 0.0009	− 3 31 2.39	− 0.012

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

JANUARY.

The Star's					At Conjunction in R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1912.0		Apparent Declination.	Washington Mean Time.	Hour Angle, H	Y	x'	y'	N.	S.
		Δα	Δδ								
		s	″	° ′	d h m	h m				°	°
32 Tauri	5.8	+0.49	+8.7	+22 13.7	1 1 27.8	- 7 43.7	+0.7296	0.5839	+0.1720	+90	+ 7
33 Tauri	6.0	0.49	8.9	22 55.4	1 32.0	- 7 39.5	+0.0490	0.5841	0.1717	+47	-28
161 B. Tauri	6.5	0.51	8.9	22 57.4	3 3.0	- 6 12.2	+0.2749	0.5857	0.1682	+60	-16
36 Tauri	5.6	0.52	9.1	23 52.0	4 21.8	- 4 56.6	-0.4114	0.5872	0.1651	+21	-52
χ Tauri	5.3	0.61	9.4	25 25.5	11 18.8	+ 1 43.5	-0.8686	0.5946	0.1465	- 6	-65
62 Tauri	6.1	+0.61	+9.1	+24 6.0	11 52.0	+ 2 15.2	+0.5253	0.5952	+0.1448	+79	0
38 B. Aurigæ	6.5	0.79	9.3	27 34.6	2 2 47.5	- 7 27.2	-1.0620	0.6090	0.0999	-22	-63
47 B. Aurigæ	6.0	0.82	9.3	27 55.4	4 37.6	- 5 41.9	-1.2232	0.6106	0.0942	-40	-63
354 B. Tauri	6.4	0.86	9.1	27 52.3	8 38.8	- 1 51.4	-0.8192	0.6136	0.0806	- 4	-63
107 B. Aurigæ	6.5	0.91	8.7	27 36.5	13 56.3	+ 3 12.1	-0.1805	0.6166	0.0622	+34	-30
112 B. Aurigæ	5.7	+0.90	+8.6	+26 52.3	14 22.7	+ 3 37.3	+0.5674	0.6169	+0.0606	+84	+ 9
406 B. Tauri	5.6	0.96	8.4	27 56.7	19 12.5	+ 8 14.2	-0.2291	0.6196	0.0438	+31	-31
136 Tauri	4.6	0.96	8.3	27 35.7	20 2.2	+ 9 1.6	+0.1486	0.6198	0.0407	+53	-10
154 B. Aurigæ	6.4	0.99	8.3	28 55.9	21 8.7	+10 5.1	-1.1158	0.6201	0.0368	-28	-62
415 B. Tauri	6.1	0.99	8.1	27 34.2	22 42.9	+11 35.0	+0.2680	0.6206	+0.0311	+60	- 4
49 Aurigæ	5.1	+1.06	+7.1	+28 5.6	3 10 33.6	- 1 6.5	-0.1309	0.6225	-0.0124	+36	-22
53 Aurigæ	5.6	1.08	7.0	29 3.8	11 38.8	- 0 4.2	-1.0920	0.6224	0.0164	-26	-61
54 Aurigæ	5.8	1.07	6.9	28 20.6	12 3.7	+ 0 19.6	-0.3976	0.6224	0.0177	+21	-38
28 Geminorum	5.5	1.09	6.8	29 3.8	13 51.3	+ 2 2.3	-1.1374	0.6223	0.0243	-31	-61
47 Geminorum	5.6	1.11	5.7	27 0.2	23 8.2	+10 54.0	+0.4861	0.6202	0.0583	+77	+ 5
53 Geminorum	5.9	+1.12	+5.5	+28 3.2	4 0 43.0	-11 35.6	-0.6343	0.6195	-0.0639	+ 8	-57
134 B. Geminorum	6.5	1.11	5.5	26 51.0	1 7.0	-11 12.6	+0.5127	0.6194	0.0652	+79	+ 6
59 Geminorum	5.7	1.13	5.2	27 48.6	3 44.0	- 8 42.7	-0.6073	0.6183	0.0746	+ 9	-57
ι Geminorum	3.9	1.13	5.2	27 58.5	4 8.8	- 8 19.0	-0.7995	0.6182	0.0759	- 3	-63
b^1 Geminorum	5.0	1.13	5.0	28 18.1	5 24.6	- 7 6.6	-1.2173	0.6177	0.0806	-40	-62
b^2 Geminorum	5.0	+1.13	+5.0	+28 6.0	5 34.8	- 6 56.9	-1.0342	0.6176	-0.0810	-20	-62
υ Geminorum	4.3	1.12	4.7	27 5.6	7 45.0	- 4 52.4	-0.2364	0.6165	0.0885	+30	-35
c Geminorum	5.5	1.10	4.5	25 59.7	10 40.1	- 2 5.1	+0.5618	0.6145	0.0984	+83	+ 6
φ Geminorum	5.0	1.11	4.0	26 59.7	14 0.3	+ 1 6.3	-0.7631	0.6122	0.1095	0	-64
ω Cancri	5.9	1.09	3.8	25 38.1	16 41.7	+ 3 40.6	+0.2588	0.6104	0.1183	+60	-12
4 Cancri	6.2	+1.08	+3.8	+25 20.0	16 59.3	+ 3 57.5	+0.5192	0.6102	-0.1190	+79	+ 1
ψ Cancri	5.9	1.10	3.3	25 46.6	20 8.7	+ 6 58.6	-0.3068	0.6077	0.1293	+27	-43
λ Cancri	5.9	1.07	3.0	24 18.1	23 51.0	+10 31.4	+0.6361	0.6044	0.1404	+90	+ 6
28 Cancri	6.1	1.06	2.6	24 26.3	5 2 50.0	-10 37.2	+0.0689	0.6018	0.1489	+48	-24
υ^1 Cancri	5.7	1.06	2.5	24 22.7	3 54.7	- 9 35.3	-0.0365	0.6008	0.1521	+42	-30
ι^2 Cancri	6.4	+1.05	+2.5	+24 23.1	4 28.1	- 9 3.3	-0.1280	0.6003	-0.1539	+37	-35
ξ Cancri	5.2	0.95	1.1	22 24.1	18 22.0	+ 4 16.4	-0.5843	0.5861	0.1904	+12	-64
79 Cancri	6.1	0.94	1.0	22 21.3	18 45.2	+ 4 38.7	-0.6109	0.5857	0.1913	+11	-65
90 H'. Cancri	6.1	0.95	+0.9	21 38.8	20 2.8	+ 5 53.2	-0.1629	0.5843	0.1941	+35	-41
57 B. Leonis	6.5	0.82	0.0	19 16.1	6 8 30.1	- 6 8.4	-0.3989	0.5707	0.2197	+23	-57
107 B. Leonis	6.3	+0.71	-0.2	+16 11.2	17 24.4	+ 2 26.1	+0.6390	0.5611	-0.2346	+87	- 5
η Leonis	3.6	0.71	0.5	17 11.5	18 5.9	+ 3 6.1	-0.5265	0.5603	0.2358	+16	-67
42 Leonis	6.1	0.66	0.8	15 25.2	7 0 22.8	+ 9 9.4	-0.2675	0.5539	0.2440	+30	-53
46 Leonis	5.8	0.61	1.0	14 35.3	4 56.9	-10 26.2	-0.5674	0.5493	0.2499	+14	-71
l Leonis	5.3	0.49	0.7	11 0.6	12 38.5	- 3 0.4	+1.0775	0.5421	0.2575	+90	+18
308 B. Leonis	5.8	+0.37	-1.1	+ 8 32.5	8 0 8.6	+ 8 6.7	+0.5623	0.5323	-0.2661	+79	-14
b Virginis	5.2	0.12	1.6	4 8.7	22 27.6	+ 5 43.5	-0.9851	0.5175	0.2731	- 9	-86
10 Virginis	6.2	+0.05	1.3	+ 2 23.5	9 3 19.9	+10 26.7	-0.5069	0.5151	0.2731	+18	-75
13 Virginis	5.9	-0.03	0.7	- 0 17.9	7 51.6	- 9 9.8	+1.0464	0.5131	0.2729	+90	+13
η Virginis	4.0	0.04	0.8	0 10.7	8 29.4	- 8 33.1	+0.7499	0.5128	0.2727	+90	- 5
38 Virginis	6.1	-0.22	-1.1	- 3 4.5	10 1 31.7	+ 7 58.7	-0.8335	0.5080	-0.2673	0	-90
91 G. Virginis	6.5	0.23	0.9	3 44.7	1 44.5	+ 8 11.2	-0.1860	0.5079	0.2672	+34	-54
θ Virginis	4.4	0.34	1.0	5 4.2	10 10.8	- 7 37.4	-1.0313	0.5067	0.2626	-11	-90
h Virginis	5.4	0.49	0.4	9 42.7	22 5.6	+ 3 56.4	+0.8108	0.5064	0.2540	+81	-
ι Libræ (*var.*)	4.7	1.09	1.2	19 27.6	13 0 32.7	+ 4 52.9	-0.1298	0.5189	0.1934	+29	-
25 Libræ	6.0	-1.09	-1.3	-19 19.0	1 5.5	+ 5 24.7	-0.3910	0.5191	-0.1924	+15	

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

JANUARY.

THE STAR'S					AT CONJUNCTION IN R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1912.0. Δα	Red'ns from 1912.0. Δδ	Apparent Declination.	Washington Mean Time.	Hour Angle, H	Y	x'	y'	N.	S.
		s	"	° '	d h m	h m				°	°
147 B. Libræ	6.2	-1.19	- 1.7	-20 25.6	**13** 9 33.6	-10 23.0	-0.7513	0.5227	-0.1785	- 6	-90
169 B. Libræ	6.0	1.25	1.3	22 51.0	13 1.5	- 7 1.7	+1.2978	0.5242	0.1723	+68	+45
172 B. Libræ	5.9	1.23	2.0	20 43.6	13 16.8	- 6 46.8	-1.0762	0.5244	0.1716	-27	-90
177 B. Libræ	6.2	1.26	1.4	22 51.8	13 46.7	- 6 17.9	+1.1825	0.5246	0.1708	+68	+29
32 B. Scorpii	5.3	1.31	1.9	23 43.0	20 47.2	+ 0 29.2	+0.9687	0.5276	0.1580	+67	+12
50 B. Scorpii	6.4	-1.37	- 2.2	-24 29.1	**14** 1 32.3	+ 5 5.2	+1.0857	0.5298	-0.1486	+66	+22
57 B. Scorpii	5.7	1.36	2.6	23 22.1	2 36.0	+ 6 6.8	-0.3017	0.5302	0.1467	+14	-62
24 G. Scorpii	6.2	1.38	2.4	24 13.7	3 25.2	+ 6 54.4	+0.5264	0.5306	0.1450	+58	-15
27 G. Scorpii	5.8	1.37	2.7	23 27.1	3 50.6	+ 7 19.0	-0.3902	0.5308	0.1441	+10	-68
41 G. Scorpii	6.3	1.40	2.7	24 11.9	6 12.5	+ 9 36.3	+0.0968	0.5318	0.1394	+34	-39
85 B. Scorpii	6.0	-1.42	- 2.4	-25 15.3	6 43.5	+10 6.3	+1.1901	0.5320	-0.1384	+65	+33
19 Scorpii	4.9	1.43	3.1	23 57.5	9 27.2	-11 15.3	-0.6101	0.5332	0.1326	- 3	-87
σ Scorpii	3.1	1.45	2.7	25 23.0	9 41.3	-11 1.7	+0.9309	0.5333	0.1321	+65	+10
22 Scorpii	4.8	1.48	3.3	24 55.4	13 55.2	- 6 56.1	-0.1184	0.5351	0.1232	+21	-51
118 B. Ophiuchi	6.2	1.59	4.7	26 23.8	**15** 6 49.6	+ 9 24.5	-0.2620	0.5414	0.0856	+ 9	-60
95 G. Ophiuchi	6.1	-1.63	- 4.7	-27 39.3	9 19.7	+11 49.5	+0.9270	0.5421	-0.0796	+63	+11
36 Ophi. (*1st star*)	5.4	1.62	5.1	26 28.6	10 42.5	-10 50.4	-0.4885	0.5425	0.0765	- 3	-77
43 Ophiuchi	5.4	1.66	5.1	28 3.6	14 17.7	- 7 22.6	+1.0090	0.5435	0.0679	+62	+18
163 G. Ophiuchi	6.3	1.68	6.2	27 50.6	23 18.7	+ 1 20.0	+0.2549	0.5456	0.0461	+33	-29
X Sagittarii (*var.*)	4.4	1.69	6.4	27 48.0	**16** 1 14.1	+ 3 11.4	+0.1216	0.5460	0.0414	+25	-37
4 G. Sagittarii	6.2	-1.67	- 6.5	-26 56.8	1 39.5	+ 3 36.0	-0.8441	0.5461	-0.0402	-26	-90
10 G. Sagittarii	5.7	1.71	6.7	28 3.2	5 20.3	+ 7 9.2	+0.2544	0.5467	0.0313	+32	-30
210 B. Scorpii	5.8	1.72	6.7	28 45.1	6 12.3	+ 7 59.4	+1.0046	0.5469	0.0290	+62	+18
38 B. Sagittarii	4.7	1.73	7.2	28 28.2	10 26.6	-11 55.1	+0.5899	0.5472	0.0185	+52	-10
C.D.-28° 14268	6.4	1.74	7.3	28 55.4	12 10.7	-10 14.5	+1.0659	0.5473	0.0143	+62	+23
48 G. Sagittarii	6.3	-1.74	- 7.7	-28 19.2	14 37.1	- 7 53.2	+0.3676	0.5475	-0.0079	+36	-23
62 B. Sagittarii	6.0	1.74	7.6	28 41.1	14 37.3	- 7 53.0	+0.7736	0.5475	0.0079	+62	+ 1
66 B. Sagittarii	4.7	1.72	7.8	27 4.6	14 56.7	- 7 34.2	-1.0165	0.5475	0.0073	-40	-90
58 G. Sagittarii	6.1	1.75	7.8	28 28.4	16 41.3	- 5 53.3	+0.5271	0.5476	-0.0028	+46	-14
				NEW	*MOON.*						
152 B. Capricorni	6.5	-1.33	-12.3	-17 15.6	**20** 18 58.8	- 6 48.6	-1.0804	0.5134	+0.2040	-23	-90
154 B. Capricorni	6.1	1.32	12.5	19 2.2	19 42.8	- 6 5.9	+1.0287	0.5131	0.2049	+71	+14
29 Aquarii (*mean*)	6.5	1.28	12.3	17 23.5	**21** 1 15.7	- 0 42.9	+0.3746	0.5107	0.2122	+57	-24
50 Aquarii	5.9	1.21	11.5	13 58.7	12 45.8	+10 27.0	-0.8504	0.5059	0.2262	- 5	-90
182 B. Aquarii	6.2	-1.19	-11.3	-13 22.2	15 42.0	-10 41.9	-0.8490	0.5048	+0.2296	- 4	-90
56 Aquarii	6.1	1.18	11.6	15 2.3	15 50.0	-10 34.2	+1.0134	0.5047	0.2297	+75	+12
70 Aquarii	6.1	1.12	10.6	11 1.4	**22** 1 32.3	- 1 8.5	-1.1061	0.5015	0.2393	-19	-90
74 Aquarii	5.8	1.10	10.7	12 5.3	4 11.7	+ 1 26.4	+0.6971	0.5007	0.2417	+78	- 8
ψ^1 Aquarii	4.5	1.01	9.7	9 34.2	16 15.8	-10 50.0	+0.9258	0.4979	0.2510	+81	+ 5
χ Aquarii	5.3	-1.02	- 9.3	- 8 12.6	16 48.5	-10 18.2	-0.4191	0.4977	+0.2514	+21	-68
ψ^2 Aquarii	4.6	1.00	9.6	9 39.9	17 22.3	- 9 45.3	+1.3080	0.4976	0.2518	+81	+35
24 Piscium	6.1	0.89	7.1	3 38.8	**23** 12 24.4	+ 8 44.7	-0.3243	0.4962	0.2614	+27	-62
27 Piscium	5.1	0.86	7.0	4 2.8	15 32.2	+11 47.3	+0.9277	0.4962	0.2625	+86	+ 5
29 Piscium	5.1	0.85	6.8	3 31.2	17 14.6	-10 33.2	+0.8080	0.4963	0.2632	+87	- 2
4 Ceti	6.3	-0.83	- 6.5	- 3 2.4	20 27.0	- 7 26.1	+1.1363	0.4965	+0.2640	+87	+19
5 Ceti	6.3	0.83	6.4	- 2 56.3	20 42.3	- 7 11.3	+1.0945	0.4966	0.2640	+88	-16
44 Piscium	6.0	0.78	4.5	+ 1 27.1	**24** 5 59.7	+ 1 50.5	-1.1601	0.4980	0.2656	-21	-89
155 B. Piscium	6.5	0.67	3.1	2 54.4	19 49.3	- 8 43.5	+0.9590	0.5019	0.2651	+90	+ 6
171 B. Piscium	6.3	0.65	1.8	6 0.5	**25** 0 18.1	- 4 22.6	-1.1548	0.5038	0.2640	-20	-84
73 Piscium	6.2	-0.61	- 1.9	+ 5 11.1	2 57.1	- 1 48.1	+0.4203	0.5049	+0.2634	+68	-22
77 Piscium	6.4	0.60	2.1	4 26.4	3 26.9	- 1 19.2	+1.3412	0.5052	0.2632	+90	+37
ε Piscium	5.6	0.60	1.7	5 11.0	4 47.4	- 0 1.0	+0.9039	0.5057	0.2629	+90	+ 3
ζ Piscium	5.6	0.58	0.9	7 6.6	7 32.6	+ 2 39.3	-0.4137	0.5070	0.2621	+23	-67
88 Piscium	6.2	0.57	1.0	6 31.8	8 3.6	+ 3 9.4	+0.3357	0.5073	0.2618	+63	-26
263 B. Piscium	6.4	-0.50	- 0.2	+ 7 30.3	15 4.1	+ 9 57.4	+1.1272	0.5112	+0.2585	+90	+19

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

JANUARY.

The Star's					At Conjunction in R. A.						Limiting Parallels.	
Name.	Mag.	Red'ns from 1912.0. Δα	Δδ	Apparent Declination.	Washington Mean Time.		Hour Angle, H	Y	x'	y'	N.	S.
		s	"	° ′	d	h m	h m				°	°
54 Ceti	6.0	−0.41	+ 1.7	+10 36.5	**26**	2 20.9	− 3 6.4	+0.7415	0.5186	+0.2513	+90	− 3
26 B. Arietis	6.0	0.37	2.4	11 52.1		6 32.8	+ 0 57.7	+0.4700	0.5215	0.2483	+72	−17
12 H'. Arietis	6.3	0.37	2.9	13 3.2		8 4.4	+ 2 26.4	−0.3893	0.5228	0.2468	+24	−62
19 Arietis	5.8	0.32	3.9	14 52.1		13 6.3	+ 7 18.8	−1.0493	0.5270	0.2417	−14	−76
36 Arietis	6.5	0.16	5.7	17 23.6	**27**	3 41.4	− 2 34.9	−0.2491	0.5402	0.2244	+31	−50
40 Arietis	6.0	−0.14	+ 6.0	+17 55.1		5 35.9	− 0 44.3	−0.3651	0.5419	+0.2220	+25	−56
π Arietis	5.2	0.12	5.7	17 6.0		5 57.1	− 0 23.8	+0.5577	0.5423	0.2215	+80	− 9
45 Arietis	6.0	0.09	6.2	17 58.6		8 52.3	+ 2 25.4	+0.2944	0.5453	0.2169	+61	−21
ρ Arietis	5.6	0.08	6.1	17 40.5		9 8.5	+ 2 41.0	+0.6650	0.5455	0.2165	+90	− 2
54 Arietis	6.5	−0.01	6.7	18 27.6		14 24.9	+ 7 46.4	+0.9770	0.5509	0.2078	+90	+17
δ Arietis	4.5	+0.01	+ 7.1	+19 23.8		15 49.9	+ 9 8.4	+0.3096	0.5524	+0.2054	+62	−19
ζ Arietis	5.0	0.02	7.6	20 43.3		17 14.6	+10 30.1	−0.7574	0.5539	0.2031	+ 3	−69
τ Arietis	5.1	0.05	7.7	20 50.0		19 58.1	−10 52.2	−0.3233	0.5567	0.1983	+26	−51
63 Arietis	5.2	0.06	7.6	20 25.8		20 37.8	−10 14.0	+0.2190	0.5574	0.1969	+57	−23
65 Arietis	6.0	0.07	7.7	20 29.6		21 20.8	− 9 32.6	+0.2944	0.5582	0.1955	+61	−19
14 H'. Tauri	6.5	+0.16	+ 8.0	+20 37.9	**28**	3 29.3	− 3 37.6	+1.3173	0.5648	+0.1832	+90	+53
23 Tauri	4.3	0.20	9.1	23 40.6		6 29.0	− 0 44.6	−1.2379	0.5680	0.1772	−36	−67
η Tauri	3.0	0.21	9.2	23 50.2		6 57.5	− 0 17.3	−1.3149	0.5685	0.1762	−50	−67
104 B. Tauri	5.5	0.21	8.9	23 9.2		7 19.3	+ 0 3.8	−0.5580	0.5689	0.1754	+14	−61
27 Tauri	3.7	0.22	9.2	23 47.3		7 38.9	+ 0 22.6	−1.1437	0.5693	0.1745	−26	−67
28 Tauri	5.2	+0.22	+ 9.2	+23 52.3		7 39.4	+ 0 23.0	−1.2272	0.5693	+0.1745	−35	−67
133 B. Tauri	5.9	0.23	8.6	21 58.8		7 59.0	+ 0 42.0	+0.7497	0.5696	0.1739	+90	+ 8
MARS	−0.6	. . .	. .	22 15.0		8 50.0	+ 1 31.1	+0.6240	0.5583	0.1708	+88	+ 2
32 Tauri	5.8	0.27	8.7	22 13.7		10 48.8	+ 3 25.3	+0.9795	0.5727	0.1671	+90	+22
33 Tauri	6.0	0.27	9.0	22 55.4		10 53.1	+ 3 29.5	+0.2873	0.5728	0.1668	+61	−16
161 B. Tauri	6.5	+0.30	+ 9.0	+22 57.4		12 27.4	+ 5 0.1	+0.5136	0.5745	+0.1631	+78	− 4
36 Tauri	5.6	0.32	9.3	23 52.0		13 49.0	+ 6 18.6	−0.1874	0.5759	0.1599	+34	−39
χ Tauri	5.3	0.42	9.9	25 25.5		21 0.7	−10 46.6	−0.6683	0.5834	0.1420	+ 7	−64
62 Tauri	6.1	0.43	9.5	24 6.0		21 35.0	−10 13.8	+0.7478	0.5840	0.1403	+90	+11
38 B. Aurigæ	6.5	0.70	10.3	27 34.6	**29**	13 0.4	+ 4 33.8	−0.9016	0.5984	0.0960	− 9	−63
47 B. Aurigæ	6.0	+0.73	+10.3	+27 55.4		14 54.0	+ 6 22.6	−1.0696	0.6000	+0.0900	−23	−63
354 B. Tauri	6.4	0.79	10.2	27 52.3		19 2.7	+10 20.7	−0.6690	0.6036	0.0770	+ 6	−61
β Tauri	1.8	0.83	10.3	28 32.2		20 58.3	−11 48.6	−1.1877	0.6048	0.0705	−36	−62
107 B. Aurigæ	6.5	0.88	9.8	27 36.5	**30**	0 29.5	− 8 26.5	−0.0348	0.6070	0.0588	+42	−22
112 B. Aurigæ	5.7	0.88	9.6	26 52.4		0 56.6	− 8 0.6	+0.7221	0.6073	0.0572	+90	+18
406 B. Tauri	5.6	+0.97	+ 9.6	+27 56.7		5 54.4	− 3 15.7	−0.0980	0.6104	+0.0406	+38	−23
136 Tauri	4.6	0.98	9.4	27 35.7		6 45.5	− 2 26.9	+0.2826	0.6109	0.0378	+62	− 3
154 B. Aurigæ	6.4	1.00	9.7	28 55.9		7 53 7	− 1 21.7	−1.0005	0.6114	0.0336	−17	−62
415 B. Tauri	6.1	1.02	9.2	27 34.3		9 30.3	+ 0 10.7	+0.3964	0.6119	+0.0281	+70	+ 3
49 Aurigæ	5.1	1.19	8.3	28 5.6		21 37.5	+11 45.7	−0.0397	0.6155	−0.0149	+42	−18
53 Aurigæ	5.6	+1.21	+ 8.4	+29 3.8		22 44.1	−11 10.7	−1.0130	0.6155	−0.0188	−19	−61
54 Aurigæ	5.8	1.21	8.2	28 20.6		23 9.5	−10 46.4	−0.3130	0.6156	0.0205	+26	−33
28 Geminorum	5.5	1.24	8.1	29 3.8	**31**	0 59.1	− 9 1.7	−1.0641	0.6157	0.0270	−23	−61
47 Geminorum	5.6	1.32	6.7	27 0.2		10 25.5	− 0 0.6	+0.5470	0.6151	0.0607	+82	+ 8
53 Geminorum	5.9	1.35	6.6	28 3.2		12 1.7	+ 1 31.4	−0.5856	0.6147	0.0662	+11	−54
134 B. Geminorum	6.5	+1.34	+ 6.4	+26 51.0		12 26.1	+ 1 54.7	+0.5682	0.6146	−0.0674	+84	+ 8
59 Geminorum	5.7	1.38	6.2	27 48.6		15 5.2	+ 4 26.8	−0.5665	0.6139	0.0771	+12	−54
ι Geminorum	3.9	1.39	6.1	27 58.5		15 30.3	+ 4 50.7	−0.7612	0.6138	0.0783	0	−63
b^1 Geminorum	5.0	1.40	6.0	28 18.1		16 47.0	+ 6 4.1	−1.1844	0.6135	0.0830	−35	−62
b^2 Geminorum	5.0	1.40	6.0	28 6.0		16 57.3	+ 6 13.9	−1.0005	0.6135	0.0834	−17	−62
υ Geminorum	4.3	+1.41	+ 5.6	+27 5.6		19 9.0	+ 8 19.8	−0.2046	0.6129	−0.0909	+32	−33
τ Geminorum	5.5	+1.41	+ 5.0	+25 59.7		22 5.9	+11 8.9	+0.5890	0.6113	−0.1008	+86	+ 7

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ψ *Geminorum*	5.0	+1.45	+ 4.7	+26 59.7	**1**	1 27.8	− 9 37.9	−0.7508	0.6096	−0.1118	+ 1	

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

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The Star's					At Conjunction in R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1912.0.		Apparent Declination.	Washington Mean Time.	Hour Angle. H	Y	x'	y'	N.	S.
		Δα	Δδ								
		s	"	° '	d h m	h m				°	°
ω Cancri	5.9	+1.45	+4.1	+25 38.1	**1** 4 10.2	- 7 2.5	+0.2666	0.6082	-0.1209	+60	-11
4 Cancri	6.2	1.45	4.1	25 20.0	4 28.0	- 6 45.5	+0.5269	0.6080	0.1217	+80	+ 1
ψ Cancri	5.9	1.47	3.6	25 46.6	7 38.4	- 3 43.3	-0.3106	0.6063	0.1317	+27	-43
λ Cancri	5.9	1.46	3.0	24 18.1	11 21.6	- 0 9.6	+0.6226	0.6035	0.1428	+89	+ 4
28 Cancri	6.1	1.48	2.6	24 26.3	14 20.8	+ 2 42.0	+0.0457	0.6013	0.1518	+47	-26
υ¹ Cancri	5.7	+1.48	+2.4	+24 22.7	15 25.6	+ 3 44.0	-0.0626	0.6006	-0.1550	+41	-31
υ² Cancri	6.4	1.48	2.3	24 23.1	15 59.0	+ 4 16.0	-0.1557	0.6001	0.1568	+35	-36
ξ Cancri	5.2	1.48	0.2	22 24.1	**2** 5 50.2	- 6 27.0	-0.6515	0.5884	0.1937	+ 8	-67
79 Cancri	6.1	1.48	+0.2	22 21.3	6 13.3	- 6 4.9	-0.6797	0.5879	0.1949	+ 7	-68
90 H.' Cancri	6.1	1.47	0.0	21 38.8	7 30.3	- 4 51.0	-0.2368	0.5868	0.1978	+31	-45
57 B. Leonis	6.5	+1.42	-1.7	+19 16.1	19 49.8	+ 6 59.6	-0.5080	0.5750	-0.2243	+17	-63
107 B. Leonis	6.3	1.35	2.6	16 11.1	**3** 4 35.9	- 8 34.1	+0.4958	0.5665	0.2395	+75	-13
η Leonis	3.6	1.36	2.8	17 11.5	5 16.7	- 7 54.9	-0.6622	0.5658	0.2408	+ 9	-73
37 Leonis	5.5	1.30	3.0	14 10.0	9 15.0	- 4 5.4	+1.3624	0.5621	0.2467	+90	+50
42 Leonis	6.1	1.31	3.4	15 25.1	11 26.6	- 1 58.5	-0.4230	0.5601	0.2495	+22	-62
46 Leonis	5.8	+1.28	-3.9	+14 35.3	15 55.0	+ 2 20.2	-0.7321	0.5560	-0.2554	+ 5	-76
l Leonis	5.3	1.20	4.4	11 0.6	23 26.1	+ 9 35.3	+0.8736	0.5495	0.2635	+90	+ 4
308 B. Leonis	5.8	1.10	5.1	8 32.5	**4** 10 38.3	- 3 35.5	+0.3344	0.5405	0.2724	+63	-26
b Virginis	5.2	0.90	6.3	4 8.6	**5** 8 17.5	- 6 38.6	-1.2394	0.5265	0.2797	-27	-86
10 Virginis	6.2	0.84	6.3	+ 2 23.4	13 0.4	- 2 4.7	-0.7770	0.5243	0.2794	+ 4	-88
13 Virginis	5.9	+0.78	-5.9	- 0 18.0	17 23.5	+ 2 10.2	+0.7459	0.5222	-0.2791	+88	- 5
η Virginis	4.0	0.77	6.0	0 10.8	18 0.0	+ 2 45.5	+0.4526	0.5219	0.2791	+71	-21
38 Virginis	6.1	0.62	6.5	3 4.6	**6** 10 29.2	- 5 15.9	-1.1293	0.5167	0.2728	-17	-90
91 G. Virginis	6.5	0.61	6.3	3 44.8	10 41.7	- 5 3.7	-0.4919	0.5166	0.2727	+19	-73
θ Virginis	4.4	0.52	6.4	5 4.3	18 51.8	+ 2 51.4	-1.3320	0.5150	0.2680	36	-90
h Virginis	5.4	+0.40	-5.8	- 9 42.8	**7** 6 24.5	9 56.9	+0.4757	0.5141	-0.2587	+70	-20
86 Virginis	5.6	+0.31	5.4	11 59.2	12 54.9	- 3 38.5	+1.2083	0.5143	0.2522	+79	+26
ι Libræ (*var.*)	4.7	-0.15	5.4	19 27.7	**9** 7 36.9	-10 15.4	-0.4387	0.5226	0.1942	+13	-71
25 Libræ	6.0	0.15	5.5	19 19.1	8 9.1	- 9 44.2	-0.6973	0.5229	0.1932	- 1	-90
147 B. Libræ	6.2	0.25	5.5	20 25.7	16 28.6	- 1 40.5	-1.0469	0.5257	0.1785	-25	-90
169 B. Libræ	6.0	-0.27	-5.0	-22 51.1	19 53.3	+ 1 37.7	+0.9897	0.5269	-0.1722	+68	+13
177 B. Libræ	6.2	0.28	5.0	22 51.9	20 37.9	+ 2 20.8	+0.8762	0.5271	0.1708	+68	+ 5
31 B. Scorpii	5.4	0.37	4.9	24 16.4	**10** 3 31.1	+ 9 0.8	+1.2829	0.5296	0.1575	+66	+44
32 B. Scorpii	5.3	0.36	5.1	23 43.1	3 32.6	+ 9 2.2	+0.6730	0.5296	0.1575	+67	- 7
40 B. Scorpii	5.4	0.39	4.9	24 34.8	5 43.5	+11 8.8	+1.2759	0.5304	0.1531	+66	+43
50 B. Scorpii	6.4	-0.42	-5.1	-24 29.1	8 14.3	-10 25.2	+0.7954	0.5313	-0.1482	+66	+ 1
57 B. Scorpii	5.7	0.42	5.5	23 22.1	9 17.3	- 9 24.3	-0.5814	0.5317	0.1460	0	-84
24 G. Scorpii	6.2	0.44	5.3	24 13.7	10 5.9	- 8 37.3	+0.2423	0.5320	0.1442	+42	-31
27 G. Scorpii	5.8	0.44	5.5	23 27.2	10 31.1	- 8 13.0	-0.6674	0.5321	0.1435	- 5	-90
41 G. Scorpii	6.3	0.47	5.4	24 12.0	12 51.5	- 5 57.2	0.1805	0.5330	0.1384	+20	-55
85 B. Scorpii	6.0	-0.48	-5.1	-25 15.3	13 22.2	- 5 27.4	+0.9066	0.5331	-0.1374	+65	+ 8
19 Scorpii	4.9	0.50	5.7	23 57.6	16 4.2	- 2 50.8	-0.8784	0.5341	0.1317	-19	-90
σ Scorpii	3.1	0.52	5.2	25 23.0	16 18.2	- 2 37.2	+0.6537	0.5342	0.1312	+63	- 8
α Scorpii	1.2	0.53	5.2	26 14.3	20 6.2	+ 1 3.2	+1.1099	0.5355	0.1232	+64	+25
22 Scorpii	4.8	0.52	5.7	24 55.4	20 29.9	+ 1 26.1	-0.3836	0.5356	0.1221	+ 7	-68
116 B. Scorpii	6.2	-0.54	5.2	-26 20.9	21 1.0	+ 1 56.2	+1.1189	0.5358	-0.1211	+64	+26
118 B. Ophiuchi	6.2	0.71	6.1	26 23.8	**11** 13 17.8	- 6 19.8	-0.5005	0.5407	0.0838	- 2	-78
95 G. Ophiuchi	6.1	0.74	5.8	27 39.3	15 47.3	- 3 55.4	+0.6883	0.5414	0.0781	+62	- 5
36 Ophi. (*1st star*)	5.4	0.75	6.4	26 28.6	17 9.7	- 2 35.8	-0.7201	0.5418	0.0747	-16	-90
43 Ophiuchi	5.4	0.76	6.1	28 3.6	20 44.2	+ 0 51.4	+0.7789	0.5426	0.0661	+62	- 1
163 G. Ophiuchi	6.3	-0.84	-6.6	-27 50.7	**12** 5 43.8	+ 9 32.6	+0.0428	0.5443	-0.0441	+21	-42
X Sagittarii (*var.*)	4.4	0.86	6.7	27 48.0	7 39.0	+11 23.9	-0.0868	0.5446	0.0394	+14	-49
4 G. Sagittarii	6.2	0.85	7.0	26 56.8	8 4.3	+11 48.3	-1.0493	0.5446	0.0385	-39	-90
10 G. Sagittarii	5.7	0.89	6.9	28 3.2	11 44.8	- 8 38.8	+0.0533	0.5450	0.0292	+21	-41
210 B. Scorpii	5.8	0.91	6.8	28 45.1	12 36.7	- 7 48.7	+0.8030	0.5451	0.0271	+62	+ 3
38 B. Sagittarii	4.7	-0.94	-7.1	-28 28.2	16 50.8	- 3 43.3	+0.3976	0.5455	-0.0167	+38	-21

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

FEBRUARY.

The Star's					At Conjunction in R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1912.0.		Apparent Declination.	Washington Mean Time.	Hour Angle, *H*	*Y*	*x'*	*y'*	N.	S.
		Δα	Δδ								
		s	"	° '	d h m	h m				°	°
C. D.−28° 14268	6.4	−0.96	− 7.1	−28 55.4	**12** 18 34.9	− 2 2.8	+0.8762	0.5457	−0.0122	+62	+ 8
48 G. Sagittarii	6.3	0.94	7.4	28 19.2	21 1.3	+ 0 18.6	+0.1838	0.5457	0.0062	+25	−33
62 B. Sagittarii	6.0	0.94	7.3	28 41.1	21 1.5	+ 0 18.8	+0.5890	0.5457	0.0062	+51	−10
66 B. Sagittarii	4.7	0.93	7.7	27 4.6	21 20.8	+ 0 37.4	−1.1973	0.5457	0.0053	−53	−90
58 G. Sagittarii	6.1	0.96	7.4	28 28.4	23 5.5	+ 2 18.5	+0.3470	0.5457	−0.0010	+34	−24
φ Sagittarii	3.3	−1.02	− 8.4	−27 5.1	**13** 9 44.2	−11 24.8	−1.0629	0.5453	+0.0258	−41	−90
τ Sagittarii	3.5	1.06	8.6	27 48.1	19 19.7	− 2 9.0	+0.0960	0.5441	0.0496	+24	−39
183 B. Sagittarii	6.2	1.06	8.4	28 46.5	19 34.0	− 1 55.3	+1.1890	0.5440	0.0501	+62	+37
234 B. Sagittarii	5.9	1.10	8.9	28 2.3	**14** 3 17.6	+ 5 32.5	+0.8302	0.5424	0.0687	+62	+ 4
248 B. Sagittarii	5.7	1.11	9.2	27 10.1	5 45.4	+ 7 55.3	+0.0407	0.5419	0.0748	+24	−42
ω Sagittarii	4.8	−1.15	− 9.8	−26 32.2	17 42.2	− 4 31.9	+0.3988	0.5384	+0.1024	+46	−22
A Sagittarii	4.9	1.13	9.8	26 26.2	19 9.5	− 3 7.6	+0.4401	0.5379	0.1057	+49	−19
40 B. Capricorni	6.2	1.17	10.4	25 14.7	**15** 11 7.1	−11 41.3	+1.0839	0.5317	0.1398	+65	+22
				NEW	*MOON.*						
20 Piscium	5.6	−1.04	− 7.8	− 3 15.2	**19** 15 30.3	−10 17.4	−1.2691	0.4988	+0.2638	−29	−90
24 Piscium	6.1	1.02	7.7	3 38.8	18 11.8	− 7 40.4	−0.1324	0.4986	0.2650	+37	−51
27 Piscium	5.1	1.00	7.6	4 2.8	21 18.3	− 4 39.2	+1.1238	0.4987	0.2659	+86	+18
29 Piscium	5.1	1.00	7.4	3 31.2	23 0.1	− 3 0.2	+1.0079	0.4988	0.2663	+87	+10
80 B. Piscium	6.3	1.01	6.8	0 59.6	**20** 0 44.8	− 1 18.5	−1.2454	0.4989	0.2667	−26	−90
4 Ceti	6.3	−0.99	− 7.1	− 3 2.4	2 11.3	+ 0 5.6	+1.3415	0.4990	+0.2670	+87	+37
5 Ceti	6.3	0.99	7.0	− 2 56.3	2 26.4	+ 0 20.2	+1.3002	0.4990	0.2671	+88	+33
44 Piscium	6.0	0.98	5.6	+ 1 27.0	11 40.9	+ 9 19.0	−0.9367	0.5001	0.2682	− 5	−89
147 B. Piscium	5.9	0.93	4.1	4 49.6	23 52.4	− 2 50.3	−1.2720	0.5029	0.2673	−30	−86
155 B. Piscium	6.5	0.91	4.3	2 54.4	**21** 1 27.9	− 1 17.7	+1.2031	0.5034	0.2670	+90	+23
171 B. Piscium	6.3	−0.91	− 3.2	+ 6 0.5	5 56.4	+ 3 3.2	−0.9078	0.5047	+0.2662	− 4	−84
73 Piscium	6.2	0.88	3.2	5 11.0	8 35.4	+ 5 37.5	+0.6730	0.5057	0.2653	+88	− 9
ε Piscium	5.6	0.87	3.1	5 11.0	10 25.6	+ 7 24.5	+1.1596	0.5065	0.2644	+90	+20
ζ Piscium	5.6	0.86	2.3	7 6.6	13 11.0	+10 5.1	−0.1581	0.5077	0.2632	+36	−52
88 Piscium	6.2	0.85	2.5	6 31.8	13 42.0	+10 35.2	+0.5940	0.5079	0.2630	+81	−13
263 B. Piscium	6.4	−0.81	− 1.7	+ 7 30.3	20 43.6	− 6 35.7	+1.3948	0.5110	+0.2595	+90	+48
54 Ceti	6.0	0.74	+ 0.1	10 36.5	**22** 8 3.9	+ 4 24.0	+1.0163	0.5173	0.2517	+90	+12
26 B. Arietis	6.0	0.71	0.9	11 52.1	12 17.7	+ 8 30.0	+0.7454	0.5201	0.2478	+90	− 2
12 H.[1] Arietis	6.3	0.71	1.4	13 3.2	13 50.2	+ 9 59.7	−0.1185	0.5211	0.2464	+38	−47
19 Arietis	5.8	0.69	2.3	14 52.1	18 55.0	− 9 5.1	−0.7823	0.5244	0.2417	+ 3	−76
27 Arietis	6.4	−0.62	+ 3.8	+17 19.0	**23** 3 25.6	− 0 50.9	−1.3249	0.5309	+0.2315	−41	−73
36 Arietis	6.5	0.54	4.3	17 23.6	9 41.7	+ 5 12.8	+0.0229	0.5360	0.2230	+45	−36
40 Arietis	6.0	0.52	4.7	17 55.1	11 38.0	+ 7 5.2	−0.0946	0.5377	0.2201	+39	−42
π Arietis	5.2	0.51	4.4	17 6.0	11 59.6	+ 7 26.1	+0.8370	0.5380	0.2195	+90	+ 7
45 Arietis	6.0	0.48	4.9	17 58.6	14 57.8	+10 18.3	+0.5706	0.5405	0.2150	+81	− 7
ρ Arietis	5.6	−0.47	+ 4.8	+17 40.4	15 14.3	+10 34.2	+0.9447	0.5407	+0.2146	+90	+14
54 Arietis	6.5	0.42	5.5	18 27.6	20 36.7	− 8 14.4	+1.2592	0.5455	0.2059	+90	+41
δ Arietis	4.5	0.41	5.9	19 23.8	22 3.3	− 6 50.8	+0.5832	0.5468	0.2033	+83	− 5
ζ Arietis	5.0	0.40	6.5	20 43.2	23 29.9	− 5 27.1	−0.4968	0.5481	0.2007	+17	−61
τ Arietis	5.1	0.36	6.7	20 49.9	**24** 2 16.8	− 2 46.0	−0.0592	0.5506	0.1957	+41	−37
63 Arietis	5.2	−0.35	+ 6.6	+20 25.8	2 57.4	− 2 6.9	+0.4896	0.5512	+0.1946	+75	− 9
65 Arietis	6.0	0.34	6.7	20 29.6	3 41.3	− 1 24.6	+0.5653	0.5519	0.1931	+82	− 5
66 Arietis	6.1	0.33	7.5	22 30.2	5 24.3	+ 0 14.8	−1.1819	0.5535	0.1900	−29	−68
17 Tauri	3.8	0.23	8.4	23 50.4	12 25.6	+ 7 0.9	−1.2700	0.5599	0.1755	−41	−67
23 Tauri	4.3	0.22	8.4	23 40.6	13 2.6	+ 7 36.5	−0.9943	0.5606	0.1740	−14	−67
η Tauri	3.0	−0.21	+ 8.4	+23 50.2	13 31.8	+ 8 4.7	−1.0725	0.5610	+0.1730	−20	−67
104 B. Tauri	5.5	0.20	8.2	23 9.2	13 54.3	+ 8 26.4	−0.3059	0.5613	0.1722	+27	−47
27 Tauri	3.7	0.20	8.4	23 47.2	14 14.3	+ 8 45.6	−0.9001	0.5616	0.1717	− 7	−67
28 Tauri	5.2	0.20	8.5	23 52.3	14 14.8	+ 8 46.1	−0.9847	0.5617	0.1714	−13	−67
133 B. Tauri	5.9	0.18	7.8	21 58.8	14 35.0	+ 9 5.6	+1.0193	0.5619	0.1709	+90	+24
32 Tauri	*5.8*	−0.13	+ 8.1	+22 13.6	17 29.1	+11 53.2	+1.2505	0.5647	+0.1644	+90	+

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

FEBRUARY.

The Star's					At Conjunction in R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1912.0.		Apparent Declination.	Washington Mean Time.	Hour Angle, H	Y	x'	y'	N.	S.
		Δα	Δδ								
		s	"	° '	d h m	h m				°	°
33 Tauri	6.0	-0.14	+ 8.3	+22 55.4	**24** 17 33.7	+11 57.7	+0.5480	0.5647	+0.1644	+81	- 2
161 B. Tauri	6.5	0.13	8.4	22 57.4	19 10.4	-10 29.3	+0.7762	0.5662	0.1607	+90	+11
36 Tauri	5.6	-0.11	8.8	23 52.0	20 34.3	- 9 8.5	+0.0636	0.5674	0.1574	+48	-26
χ Tauri	5.3	+0.01	9.6	25 25.5	**25** 3 58.4	- 2 1.3	-0.4321	0.5741	0.1390	+20	-51
62 Tauri	6.1	0.03	9.2	24 6.0	4 33.8	- 1 27.4	+1.0053	0.5746	0.1375	+90	+27
38 B. Aurigæ	6.5	+0.30	+10.7	+27 34.6	20 28.7	-10 10.2	-0.6896	0.5877	+0.0936	+ 5	-62
47 B. Aurigæ	6.0	0.34	10.8	27 55.4	22 26.2	- 8 17.5	-0.8632	0.5891	0.0874	- 6	-63
354 B. Tauri	6.4	0.42	10.7	27 52.3	**26** 2 43.4	- 4 10.9	-0.4620	0.5920	0.0741	+18	-47
β Tauri	1.8	0.46	10.9	28 32.2	4 43.0	- 2 16.1	-0.9924	0.5933	0.0682	-16	-62
107 B. Aurigæ	6.5	0.53	10.5	27 36.5	8 21.6	+ 1 13.4	+0.1755	0.5955	0.0569	+55	-10
112 B. Aurigæ	5.7	+0.54	+10.3	+26 52.4	8 49.7	+ 1 40.3	+0.9447	0.5957	+0.0553	+90	+31
406 B. Tauri	5.6	0.64	10.5	27 56.7	13 58.1	+ 6 35.8	+0.1028	0.5983	0.0384	+50	-13
136 Tauri	4.6	0.66	10.3	27 35.7	14 51.1	+ 7 26.5	+0.4883	0.5988	0.0353	+77	+ 7
154 B. Aurigæ	6.4	0.69	10.7	28 55.9	16 1.7	+ 8 34.1	-0.8192	0.5993	0.0317	- 4	-62
415 B. Tauri	6.1	0.71	10.2	27 34.3	17 41.8	+10 10.0	+0.5999	0.6001	+0.0262	+88	+14
49 Aurigæ	5.1	+0.93	+ 9.6	+28 5.7	**27** 6 15.4	- 1 48.6	+0.1359	0.6036	-0.0163	+52	- 9
53 Aurigæ	5.6	0.97	9.8	29 3.8	7 24.4	- 0 42.5	-0.8562	0.6037	0.0203	- 7	-61
54 Aurigæ	5.8	0.97	9.5	28 20.7	7 50.7	- 0 17.3	-0.1447	0.6037	0.0216	+36	-24
28 Geminorum	5.5	1.01	9.6	29 3.8	9 44.3	+ 1 31.4	-0.9120	0.6037	0.0281	-11	-61
47 Geminorum	5.6	1.14	8.1	27 0.2	19 31.0	+10 53.0	+0.7089	0.6037	0.0612	+90	+16
53 Geminorum	5.9	+1.18	+ 8.2	+28 3.2	21 10.5	-11 31.8	-0.4456	0.6032	-0.0667	+19	-45
134 B. Geminorum	6.5	1.17	7.8	26 51.1	21 35.8	-11 7.6	+0.7263	0.6031	0.0683	+90	+17
59 Geminorum	5.7	1.23	7.8	27 48.7	**28** 0 20.4	- 8 30.0	-0.4318	0.6025	0.0775	+20	-45
ι Geminorum	3.9	1.24	7.8	27 58.6	0 46.4	- 8 5.2	-0.6302	0.6024	0.0787	+ 8	-58
b^1 Geminorum	5.0	1.26	7.7	28 18.1	2 5.7	- 6 49.3	-1.0629	0.6021	0.0830	-22	-62
b^2 Geminorum	5.0	+1.26	+ 7.6	+28 6.0	2 16.3	- 6 39.1	-0.8766	0.6020	-0.0838	- 7	-62
υ Geminorum	4.3	1.28	7.1	27 5.6	4 32.5	- 4 28.7	-0.0720	0.6015	0.0914	+40	-26
c Geminorum	5.5	1.31	6.4	25 59.8	7 35.3	- 1 33.7	+0.7279	0.6006	0.1011	+90	+14
φ Geminorum	5.0	1.38	6.2	26 59.8	11 3.8	+ 1 46.1	-0.6390	0.5990	0.1120	+ 8	-61
ω Cancri	5.9	1.39	5.5	25 38.2	13 51.4	+ 4 26.7	+0.3879	0.5977	0.1206	+69	- 6
4 Cancri	6.2	+1.39	+ 5.4	+25 20.0	14 9.7	+ 4 44.2	+0.6512	0.5975	-0.1217	+90	+ 8
ψ Cancri	5.9	1.44	5.0	25 46.6	17 26.1	+ 7 52.4	-0.2048	0.5961	0.1318	+33	-37
λ Cancri	5.9	1.45	4.3	24 18.1	21 15.9	+11 32.7	+0.7332	0.5939	0.1431	+90	+10
28 Cancri	6.1	1.49	3.8	24 26.3	**29** 0 20.4	- 9 30.3	+0.1418	0.5919	0.1519	+52	-21
$υ^1$ Cancri	5.7	1.50	3.7	24 22.8	1 27.1	- 8 26.4	+0.0295	0.5913	0.1550	+46	-27
$υ^2$ Cancri	6.4	+1.50	+ 3.6	+24 23.1	2 1.3	- 7 53.6	-0.0659	0.5909	-0.1567	+41	-32
ξ Cancri	5.2	1.60	1.1	22 24.1	16 13.8	+ 5 44.8	-0.5990	0.5810	0.1937	+12	-65
79 Cancri	6.1	1.60	1.1	22 21.3	16 37.4	+ 6 7.4	-0.6281	0.5808	0.1946	+10	-66
90 H.^{1} Cancri	6.1	+1.59	+ 0.7	+21 38.8	17 56.1	+ 7 23.0	-0.1836	0.5798	-0.1979	+34	-43

MARCH.

57 B. Leonis	6.5	+1.62	- 1.4	+19 16.1	**1** 6 30.0	- 4 32.0	-0.4867	0.5698	-0.2249	+18	-62
107 B. Leonis	6.3	1.60	3.0	16 11.1	15 23.9	+ 4 2.0	+0.5019	0.5628	0.2403	+75	-13
η Leonis	3.6	1.62	3.0	17 11.5	16 5.2	+ 4 41.7	-0.6645	0.5622	0.2416	+ 9	-73
37 Leonis	5.5	+1.58	- 3.8	+14 10.0	20 6.2	+ 8 34.0	+1.3602	0.5591	-0.2479	+90	+49
42 Leonis	6.1	1.61	4.0	15 25.1	22 19.1	+10 42.2	-0.4392	0.5574	0.2509	+21	-63
46 Leonis	5.8	1.60	4.7	14 35.3	**2** 2 49.7	- 8 56.8	-0.7607	0.5541	0.2569	+ 4	-76
l Leonis	5.3	1.55	5.7	11 0.6	10 23.2	- 1 39.3	+0.8302	0.5486	0.2656	+90	+ 1
308 B. Leonis	5.8	1.52	7.1	8 32.4	21 36.1	+ 9 10.6	+0.2609	0.5412	0.2753	+59	-30
σ Leonis	4.1	+1.49	- 7.4	+ 6 30.6	**3** 0 52.9	-11 39.2	+1.3912	0.5392	-0.2773	+90	+46
b Virginis	5.2	1.43	9.1	4 8.6	19 6.7	+ 5 58.7	-1.3580	0.5300	0.2839	-39	-86
10 Virginis	6.2	1.39	9.4	+ 2 23.4	23 46.2	+10 29.3	-0.9072	0.5283	0.2836	- 4	-88
13 Virginis	5.9	1.34	9.4	- 0 18.0	**4** 4 5.6	- 9 19.5	+0.5977	0.5268	0.2834	+82	-14
η Virginis	4.0	1.34	9.5	0 10.8	4 41.7	- 8 44.5	+0.3051	0.5266	0.2833	+62	-29
38 Virginis	6.1	+1.25	-10.4	- 3 4.7	20 53.5	+ 6 56.6	-1.2951	0.5227	-0.2777	-31	-90

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

MARCH.

The Star's					At Conjunction in R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1912.0. Δα	Red'ns from 1912.0. Δδ	Apparent Declination.	Washington Mean Time.	Hour Angle, H	Y	x'	y'	N.	S.
		s	"	° '	d h m	h m				°	°
G. Virginis	6.5	+1.25	−10.3	− 3 44.9	4 21 5.7	+ 7 8.5	−0.6637	0.5227	−0.2776	+10	−87
Virginis	5.4	1.09	10.2	9 42.9	5 16 22.1	+ 1 48.8	+0.2658	0.5213	0.2634	+57	−31
Virginis	5.6	1.06	10.1	11 59.3	22 42.8	+ 7 57.5	+0.9831	0.5216	0.2569	+79	+ 9
B. Virginis	6.4	0.98	9.7	14 33.1	6 7 44.8	− 7 17.4	+1.3945	0.5224	0.2468	+76	+52
Libræ (*var.*)	4.7	0.72	9.3	19 27.7	7 16 18.7	+ 0 14.4	−0.6733	0.5295	0.1969	0	−90
Libræ	6.0	+0.71	− 9.4	−19 19.2	16 50.1	+ 0 44.8	−0.9290	0.5296	−0.1960	−15	−90
B. Libræ	6.2	0.66	9.3	20 25.7	8 0 57.5	+ 8 36.3	−1.2759	0.5320	0.1807	−45	−90
B. Libræ	6.0	0.63	8.5	22 51.1	4 17.5	+11 49.7	+0.7396	0.5330	0.1743	+68	− 3
B. Libræ	6.2	0.62	8.5	22 51.9	5 1.1	−11 28.2	+0.6275	0.5333	0.1729	+66	−10
Libræ	5.0	0.61	8.3	23 32.1	5 26.3	−11 3.8	+1.2770	0.5334	0.1722	+67	+41
B. Scorpii	5.4	+0.55	− 8.1	−24 16.4	11 45.0	− 4 57.6	+1.0313	0.5352	−0.1591	+66	+17
B. Scorpii	5.3	0.55	8.3	23 43.1	11 46.5	− 4 56.2	+0.4271	0.5352	0.1591	+53	−21
B. Scorpii	5.4	0.53	8.1	24 34.8	13 54.6	− 2 52.3	+1.0247	0.5359	0.1545	+66	+16
B. Scorpii	6.4	0.51	8.1	24 29.2	16 22.2	− 0 29.6	+0.5497	0.5366	0.1495	+59	−14
B. Scorpii	5.7	0.50	8.5	23 22.2	17 23.9	+ 0 30.0	−0.8140	0.5369	0.1472	−13	−90
G. Scorpii	6.2	+0.49	− 8.2	−24 13.8	18 11.6	+ 1 16.1	+0.0021	0.5371	−0.1457	+29	−44
G. Scorpii	5.8	0.48	8.5	23 27.2	18 36.2	+ 1 39.9	−0.8995	0.5372	0.1447	−19	−90
G. Scorpii	6.3	0.49	8.4	24 12.0	20 53.9	+ 3 52.9	−0.4160	0.5379	0.1396	+ 8	−71
B. Scorpii	6.0	0.49	8.0	25 15.4	21 23.9	+ 4 21.9	+0.6616	0.5380	0.1386	+64	− 7
Scorpii	4.9	0.46	8.5	23 57.6	9 0 2.8	+ 6 55.6	−1.1071	0.5387	0.1327	−35	−90
Scorpii	3.1	+0.46	− 8.0	−25 23.1	0 16.5	+ 7 8.8	+0.4117	0.5388	−0.1321	+49	−21
Scorpii	1.2	0.42	7.7	26 14.4	4 0.3	+10 45.1	+0.8656	0.5398	0.1238	+64	+ 6
Scorpii	4.8	0.41	8.2	24 55.5	4 23.5	+11 7.4	−0.6149	0.5399	0.1230	− 5	−89
B. Scorpii	6.2	0.41	7.7	26 20.9	4 54.1	+11 37.0	+0.8748	0.5401	0.1217	+64	+ 6
B. Scorpii	6.4	0.35	7.4	27 17.6	10 44.1	− 6 44.8	+1.2365	0.5415	0.1083	+63	+41
B. Ophiuchi	6.2	+0.27	− 7.8	−26 23.8	20 55.4	+ 3 5.5	−0.7236	0.5436	−0.0840	−15	−90
G. Ophiuchi	6.1	0.24	7.4	27 39.4	23 22.8	+ 5 27.8	+0.4584	0.5440	0.0778	+47	−18
Ophi. (*1st star*)	5.4	0.22	8.0	26 28.6	10 0 44.2	+ 6 46.4	−0.9395	0.5442	0.0745	−29	−90
Ophiuchi	5.4	0.19	7.2	28 3.6	4 15.9	+10 10.8	+0.5517	0.5448	0.0660	+52	−13
G. Ophiuchi	6.3	0.10	7.3	27 50.7	13 9.7	− 5 13.9	−0.1732	0.5457	0.0438	+10	−55
Sagittarii (*var.*)	4.4	+0.08	− 7.4	−27 48.0	15 3.8	− 3 23.7	−0.3007	0.5458	−0.0390	+ 3	−63
G. Sagittarii	6.2	0.07	7.7	26 56.8	15 28.9	− 2 59.6	−1.2575	0.5458	0.0378	−58	−90
G. Sagittarii	5.7	0.07	7.3	28 3.2	19 7.4	+ 0 31.4	−0.1585	0.5461	0.0287	+ 9	−54
B. Scorpii	5.8	0.06	7.0	28 45.1	19 58.9	+ 1 21.1	+0.5886	0.5461	0.0266	+52	−11
B. Sagittarii	4.7	+0.01	7.2	28 28.2	11 0 11.1	+ 5 24.6	+0.1884	0.5460	0.0159	+27	−33
C.D.−28° 14268	6.4	−0.01	− 7.0	−28 55.4	1 54.4	+ 7 4.3	+0.6663	0.5459	−0.0113	+57	− 6
G. Sagittarii	6.3	0.03	7.3	28 19.2	4 19.9	+ 9 24.8	−0.0209	0.5459	0.0052	+15	−46
B. Sagittarii	6.0	0.03	7.1	28 41.1	4 20.1	+ 9 25.0	+0.3826	0.5459	−0.0052	+37	−22
G. Sagittarii	6.1	0.05	7.2	28 28.4	6 23.3	+11 23.9	+0.1432	0.5458	0.0000	+22	−36
Sagittarii	3.3	0.16	7.6	27 5.0	16 59.1	− 2 22.3	−1.2517	0.5446	+0.0267	−58	−90
Sagittarii	3.5	−0.22	− 7.4	−27 48.1	12 2 33.0	+ 6 51.9	−0.0874	0.5428	+0.0504	+15	−50
B. Sagittarii	6.2	0.22	7.0	28 46.5	2 47.3	+ 7 5.7	+1.0030	0.5427	0.0510	+62	+17
B. Sagittarii	5.9	0.30	7.3	28 2.3	10 30.3	− 9 27.1	+0.6539	0.5408	0.0697	+59	− 7
B. Sagittarii	5.7	0.32	7.5	27 10.1	12 58.0	− 7 4.4	−0.1314	0.5401	0.0756	+16	−52
Sagittarii	4.8	0.39	7.6	26 32.1	13 0 55.0	+ 4 28.6	+0.2400	0.5363	0.1032	+37	−31
Sagittarii	4.6	−0.40	− 7.3	−27 24.4	1 25.5	+ 4 58.0	+1.2569	0.5361	+0.1045	+63	+46
Sagittarii	4.9	0.41	7.6	26 26.2	2 22.3	+ 5 52.9	+0.2831	0.5358	0.1067	+40	−28
B. Capricorni	6.2	0.54	7.8	25 14.6	18 21.0	− 2 39.8	+0.9460	0.5296	0.1411	+65	+11
B. Capricorni	6.3	0.53	7.9	24 5.9	21 50.6	+ 0 43.0	+0.1842	0.5281	0.1480	+39	−34
B. Capricorni	6.2	0.58	7.9	24 6.9	14 4 2.6	+ 6 43.2	+1.1585	0.5255	0.1601	+66	+28
Capricorni	5.3	−0.63	− 8.4	−21 33.0	11 39.5	− 9 54.3	−0.3980	0.5224	+0.1740	+13	−69
Capricorni	6.1	0.64	8.6	20 54.8	12 8.8	− 9 25.9	−1.0148	0.5222	0.1749	−22	−90
Capricorni	5.3	0.66	8.5	21 1.2	15 8.7	− 6 31.6	−0.3634	0.5209	0.1802	+15	−66
Capricorni	5.3	0.66	8.3	21 13.7	19 22.0	− 2 26.2	+0.6437	0.5192	0.1876	+68	− 9
Capricorni	6.0	0.66	8.1	21 34.8	20 54.0	− 0 57.0	+1.3201	0.5186	0.1900	+69	+46
B. Capricorni	6.5	−0.68	− 8.6	−19 32.1	22 17.5	+ 0 24.0	−0.6640	0.5180	+0.1923		

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

MARCH.

The Star's							At Conjunction in R. A.					Limiting Parallels.	
Name.			Mag.	Red'ns from 1912.0. Δα	Red'ns from 1912.0. Δδ	Apparent Declination.	Washington Mean Time.	Hour Angle, H	Y	x′	y′	N.	S.
				s	″	° ′	d h m	h m				°	°
37		Capricorni	5.7	−0.69	− 8.3	−20 28.8	15 0 43.0	+ 2 44.9	+0.8461	0.5170	+0.1962	+70	+ 2
ε		Capricorni	4.7	0.70	8.4	19 51.8	1 50.4	+ 3 50.3	+0.3906	0.5166	0.1979	+56	−23
κ		Capricorni	4.8	0.71	8.5	19 16.2	4 38.9	+ 6 33.7	+0.3019	0.5155	0.2025	+52	−28
143	B.	Capricorni	6.1	0.71	8.3	20 1.5	4 55.8	+ 6 50.0	+1.1879	0.5154	0.2028	+70	+27
152	B.	Capricorni	6.5	0.74	8.8	17 15.5	8 30.1	+10 17.8	−1.1133	0.5140	0.2083	−25	−90
154	B.	Capricorni	6.1	−0.74	− 8.4	−19 2.1	9 13.7	+11 0.1	+0.9872	0.5137	+0.2093	+71	+11
161	B.	Capricorni	6.4	0.76	8.4	18 19.7	14 35.7	− 7 47.5	+1.3552	0.5118	0.2167	+72	+48
29		Aquarii (*mean*)	6.5	0.77	8.6	17 23.5	14 44.1	− 7 39.4	+0.3593	0.5118	0.2170	+57	−25
50		Aquarii	5.9	0.81	8.6	−13 58.7	16 2 7.6	+ 3 23.9	−0.8102	0.5081	0.2313	− 2	−90
						NEW	*MOON.*						
54		Ceti	6.0	−0.96	− 0.9	+10 36.5	20 14 0.5	−11 52.0	+1.1280	0.5220	+0.2548	+90	+20
26	B.	Arietis	6.0	0.95	− 0.2	11 52.1	18 10.6	− 7 49.7	+0.8628	0.5245	0.2514	+90	+ 3
12	H.[1]	Arietis	6.3	0.96	+ 0.1	13 3.2	19 41.8	− 6 21.4	+0.0044	0.5255	0.2499	+45	−40
19		Arietis	5.8	0.95	0.9	14 52.1	21 0 42.5	− 1 30.2	−0.6522	0.5290	0.2442	+10	−76
27		Arietis	6.4	−0.91	+ 1.3	+17 18.9	9 6.8	+ 6 37.7	−1.1871	0.5349	+0.2341	−26	−73
36		Arietis	6.5	0.86	2.9	17 23.6	15 18.7	−11 22.8	+0.1599	0.5396	0.2253	+53	−29
40		Arietis	6.0	0.85	3.2	17 55.1	17 13.8	− 9 31.6	+0.0436	0.5410	0.2226	+47	−35
π		Arietis	5.2	0.84	3.1	17 6.0	17 35.2	− 9 10.9	+0.9730	0.5413	0.2221	+90	+15
45		Arietis	6.0	0.83	3.5	17 58.6	20 31.7	− 6 20.3	+0.7091	0.5437	0.2173	+90	0
ρ		Arietis	5.6	−0.82	+ 3.4	+17 40.4	20 48.2	− 6 4.5	+1.0827	0.5439	+0.2169	+90	+23
δ		Arietis	4.5	0.77	4.5	19 23.7	22 3 33.8	+ 0 27.1	+0.7253	0.5495	0.2049	+90	+ 2
ζ		Arietis	5.0	0.77	5.0	20 43.2	4 59.7	+ 1 50.0	−0.3526	0.5505	0.2026	+25	−53
τ		Arietis	5.1	0.74	5.3	20 49.9	7 45.6	+ 4 30.1	+0.0853	0.5528	0.1976	+49	−29
63		Arietis	5.2	0.73	5.2	20 25.8	8 26.0	+ 5 9.0	+0.6336	0.5534	0.1961	+89	− 1
65		Arietis	6.0	−0.72	+ 5.3	+20 29.6	9 9.6	+ 5 51.1	+0.7097	0.5540	+0.1946	+90	+ 3
66		Arietis	6.1	0.72	6.0	22 30.2	10 52.1	+ 7 29.9	−1.0361	0.5554	0.1911	−16	−68
16		Tauri	5.4	0.65	7.1	24 0.9	17 49.8	− 9 47.6	−1.3107	0.5612	0.1767	−48	−66
17		Tauri	3.8	0.65	7.0	23 50.4	17 51.8	− 9 45.6	−1.1233	0.5613	0.1765	−24	−67
20		Tauri	4.1	0.65	7.1	24 5.7	18 15.7	− 9 22.6	−1.3173	0.5616	0.1757	−50	−66
23		Tauri	4.3	−0.64	+ 7.0	+23 40.6	18 28.7	− 9 10.1	−0.8476	0.5618	+0.1752	− 3	−67
η		Tauri	3.0	0.65	7.1	23 50.1	18 57.8	− 8 42.0	−0.9266	0.5622	0.1742	− 9	−67
104	B.	Tauri	5.5	0.63	6.9	23 9.2	19 20.2	− 8 20.4	−0.1588	0.5625	0.1734	+35	−39
27		Tauri	3.7	0.64	7.1	23 47.2	19 40.2	− 8 1.2	−0.7535	0.5628	0.1725	+ 2	−67
28		Tauri	5.2	0.64	7.1	23 52.2	19 40.7	− 8 0.7	−0.8379	0.5628	0.1725	− 3	67
133	B.	Tauri	5.9	−0.61	+ 6.6	+21 58.7	20 0.8	− 7 41.3	+1.1676	0.5631	+0.1716	+90	+36
33		Tauri	6.0	0.58	7.1	22 55.4	22 59.3	− 4 49.4	+0.6968	0.5654	0.1648	+90	− 6
161	B.	Tauri	6.5	0.56	7.2	22 57.3	23 0 36.0	− 3 16.3	+0.9260	0.5668	0.1608	+90	+20
36		Tauri	5.6	0.55	7.6	23 52.0	1 59.8	− 1 55.7	+0.2119	0.5678	0.1577	+57	−19
χ		Tauri	5.3	0.45	8.6	25 25.5	9 24.6	+ 5 12.2	−0.2850	0.5736	0.1392	+29	−42
62		Tauri	6.1	−0.43	+ 8.2	+24 5.9	10 0.1	+ 5 46.3	+1.1569	0.5741	+0.1376	+90	−39
17	B.	Aurigæ	6.0	0.27	10.0	27 45.2	21 23.5	− 7 17.0	−1.1912	0.5820	0.1064	−35	−63
38	B.	Aurigæ	6.5	0.19	10.2	27 34.6	24 2 1.1	− 2 50.5	−0.5473	0.5849	0.0926	+13	−54
47	B.	Aurigæ	6.0	0.15	10.4	27 55.4	3 59.7	− 0 56.6	−0.7226	0.5860	0.0870	+ 3	−63
354	B.	Tauri	6.4	0.07	10.5	27 52.3	8 19.7	+ 3 12.8	−0.3202	0.5884	0.0740	+26	−39
22		Aurigæ	6.4	−0.06	+10.8	+28 51.4	9 13.8	+ 4 4.7	−1.2592	0.5888	+0.0710	−48	−62
β		Tauri	1.8	−0.03	10.7	28 32.2	10 20.9	+ 5 9.1	−0.8551	0.5893	0.0676	− 6	−62
107	B.	Aurigæ	6.5	+0.04	10.5	27 36.5	14 2.5	+ 8 41.6	+0.3203	0.5909	0.0559	+64	− 3
112	B.	Aurigæ	5.7	0.05	10.2	26 52.4	14 31.0	+ 9 8.9	+1.0960	0.5911	0.0544	+90	+42
116	B.	Aurigæ	5.9	0.07	11.0	29 10.1	15 17.9	+ 9 53.9	−1.2000	0.5915	0.0521	−38	−61
406	B.	Tauri	5.6	+0.14	+10.6	+27 56.7	19 44.2	− 9 50.8	+0.2455	0.5932	+0.0380	+59	− 6
136		Tauri	4.6	0.15	10.5	27 35.7	20 38.0	− 8 59.2	+0.6342	0.5934	0.0349	+90	+14
154	B.	Aurigæ	6.4	0.18	11.0	28 55.9	21 49.9	− 7 50.3	−0.6855	0.5937	0.0310	+ 5	−60
415	B.	Tauri	6.1	0.21	10.5	27 34.3	23 31.7	− 6 12.7	+0.7459	0.5942	0.0255	+90	+21
183	B.	Aurigæ	6.3	0.25	11.1	29 31.4	25 1 30.8	− 4 18.7	−1.1929	0.5946	0.0193	−37	−61
κ		*Aurigæ*	4.4	+0.32	+11.1	+29 32.1	4 53.8	− 1 4.1	−1.1574	0.5954	+0.0079	−33	−61

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

MARCH.

THE STAR'S					AT CONJUNCTION IN R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1912.0. Δα	Red'ns from 1912.0. Δδ	Apparent Declination.	Washington Mean Time.	Hour Angle, H	Y	x'	y'	N.	S.
		s	"	° '	d h m	h m				°	°
B. Aurigæ	6.3	+0.37	+11.0	+29 35.1	25 7 4.4	+ 1 1.1	−1.1981	0.5959	+0.0008	−38	−61
Aurigæ	5.1	0.47	10.3	28 5.7	12 20.6	+ 6 4.0	+0.2726	0.5960	−0.0166	+61	− 2
Aurigæ	5.6	0.50	10.6	29 3.8	13 31.1	+ 7 11.6	−0.7311	0.5960	0.0202	+ 2	−61
Aurigæ	5.8	0.50	10.3	28 20.7	13 58.0	+ 7 37.4	−0.0121	0.5960	0.0218	+44	−17
Geminorum	5.5	0.55	10.5	29 3.8	15 54.3	+ 9 28.8	−0.7892	0.5961	0.0282	− 2	−61
Geminorum	5.6	+0.71	+ 9.2	+27 0.3	26 1 55.7	− 4 54.8	+0.8463	0.5946	−0.0611	+90	+24
Geminorum	5.9	0.75	9.5	28 3.2	3 38.0	− 3 16.8	−0.3241	0.5942	0.0665	+26	−37
B. Geminorum	6.5	0.75	9.0	26 51.1	4 3.9	− 2 51.9	+0.8628	0.5942	0.0681	+90	+25
Geminorum	5.7	0.81	9.1	27 48.7	6 53.0	− 0 9.9	−0.3125	0.5936	0.0770	+27	−38
Geminorum	3.9	0.82	9.1	27 58.6	7 19.8	+ 0 15.8	−0.5138	0.5934	0.0785	+15	−50
Geminorum	5.0	+0.85	+ 9.1	+28 18.2	8 41.3	+ 1 33.9	−0.9532	0.5929	−0.0826	−13	−62
Geminorum	5.0	0.86	9.1	28 6.1	8 52.3	+ 1 44.5	−0.7642	0.5928	0.0833	0	−62
Geminorum	4.3	0.89	8.5	27 5.7	11 12.4	+ 3 58.8	+0.0494	0.5919	0.0904	+47	−20
Geminorum	5.5	0.93	7.9	25 59.8	14 20.5	+ 6 59.2	+0.8586	0.5906	0.1000	+90	+21
Geminorum	5.0	1.01	7.9	26 59.8	17 55.3	+10 25.2	−0.5302	0.5892	0.1112	+15	−54
Cancri	5.9	+1.03	+ 7.1	+25 38.2	20 48.0	−10 49.1	+0.5095	0.5877	−0.1196	+79	0
Cancri	6.2	1.03	7.0	25 20.1	21 6.9	−10 30.9	+0.7762	0.5875	0.1206	+90	+15
Cancri	5.9	1.09	6.7	25 46.6	27 0 29.4	− 7 16.7	−0.0947	0.5857	0.1302	+39	−32
Cancri	5.9	1.13	5.9	24 18.1	4 26.5	− 3 29.1	+0.8543	0.5835	0.1416	+90	+17
Cancri	6.1	1.19	5.5	24 26.3	7 36.9	− 0 26.3	+0.2517	0.5817	0.1504	+59	−15
Cancri	5.7	+1.20	+ 5.4	+24 22.8	8 45.7	+ 0 39.8	+0.1369	0.5809	−0.1535	+52	−21
Cancri	6.4	1.21	5.3	24 23.2	9 21.1	+ 1 13.8	+0.0392	0.5806	0.1550	+47	−27
B. Cancri (*2d star*)	6.3	1.37	3.3	23 20.1	23 14.3	− 9 25.3	−1.3047	0.5711	0.1894	−45	−67
Cancri	5.2	1.37	2.9	22 24.2	28 0 1.5	− 8 39.8	−0.5148	0.5706	0.1912	+16	−60
Cancri	6.1	1.38	2.9	22 21.3	0 25.9	− 8 16.3	−0.5450	0.5704	0.1920	+15	−62
H.[1] Cancri	6.1	+1.38	+ 2.5	+21 38.8	1 47.2	− 6 58.1	−0.0948	0.5693	−0.1952	+39	−38
B. Leonis	6.5	1.49	+ 0.1	19 16.1	14 45.6	+ 5 31.4	−0.4157	0.5599	0.2218	+22	−58
B. Leonis	6.3	1.52	− 1.8	16 11.1	23 56.0	− 9 38.0	+0.5768	0.5536	0.2375	+81	− 8
Leonis	3.6	1.54	1.7	17 11.5	29 0 38.6	− 8 57.0	−0.6065	0.5531	0.2386	+12	−70
Leonis	6.1	1.56	2.9	15 25.1	7 3.6	− 2 45.4	−0.3855	0.5486	0.2487	+24	−60
Leonis	5.8	+1.58	− 3.7	+14 35.3	11 41.9	+ 1 43.2	−0.7163	0.5458	−0.2543	+ 7	−76
Leonis	5.3	1.57	5.3	11 0.6	19 27.5	+ 9 12.9	+0.8841	0.5410	0.2636	+90	+ 4
B. Leonis	5.8	1.60	7.1	8 32.4	30 6 56.4	− 3 41.1	+0.2932	0.5348	0.2739	+61	−28
Leonis	4.1	1.59	7.7	6 30.6	10 17.5	− 0 26.5	+1.4299	0.5334	0.2757	+90	+56
Virginis	5.2	1.62	9.8	4 8.6	31 4 50.4	− 6 29.5	−1.3658	0.5264	0.2830	−40	−86
Virginis	6.2	+1.61	−10.4	+ 2 23.4	9 33.5	− 1 55 3	−0.9175	0.5252	−0.2834	− 4	−88
Virginis	5.9	1.59	10.8	− 0 18.1	13 55.8	+ 2 18.7	+0.5905	0.5243	0.2831	+81	−14
Virginis	4.0	1.59	10.9	− 0 10.9	14 32.2	+ 2 54.0	+0.2957	0.5242	−0.2831	+61	−29

APRIL.

Name.	Mag.	Δα	Δδ	Apparent Declination.	Washington Mean Time.	Hour Angle, H	Y	x'	y'	N.	S.
Virginis	6.	+1.59	−12.1	− 3 4.7	1 6 50.4	− 5 18.5	−1.3295	0.5222	−0.2789	−34	−90
G. Virginis	6.5	1.58	12.2	3 44.9	7 2.7	− 5 6.5	−0.6963	0.5222	0.2788	+ 8	−90
Virginis	5.4	1.54	12.9	9 42.9	2 2 18.6	−10 26.7	+0.2147	0.5232	0.2651	+55	−33
Virginis	5.6	1.52	13.0	11 59.4	8 37.4	− 4 19.8	+0.9249	0.5240	0.2591	+79	+ 5
B. Virginis	6.4	+1.50	−12.9	−14 33.2	17 35.3	+ 4 21.2	+1.3268	0.5257	−0.2491	+76	+39
Libræ (*var.*)	4.7	1.42	12.4	19 27.8	4 1 44.4	+11 28.1	−0.7537	0.5348	0.1993	− 3	−90
Libræ	6.0	1.42	12.5	19 19.2	2 15.3	+11 58.0	−1.0081	0.5350	0.1982	−19	−90
B. Libræ	6.0	1.37	11.5	22 51.2	13 31.4	− 1 8.4	+0.6466	0.5386	0.1765	+67	− 9
B. Libræ	6.2	1.37	11.5	22 52.0	14 14.2	− 0 27.1	+0.5349	0.5388	0.1751	+60	−15
Libræ	5.0	+1.37	−11.3	−23 32.1	14 39.0	− 0 3.1	+1.1803	0.5390	−0.1741	+67	+29
B. Scorpii	5.4	1.36	11.0	24 16.5	20 51.3	+ 5 56.6	+0.9341	0.5409	0.1611	+66	+ 9
B. Scorpii	5.3	1.36	11.2	23 43.2	20 52.8	+ 5 58.1	+0.3337	0.5409	0.1611	+48	−26
B. Scorpii	5.4	1.35	10.9	24 34.9	22 58.7	+ 7 59.8	+0.9270	0.5415	0.1566	+66	+ 9
B. Scorpii	6.4	1.33	10.8	24 29.2	5 1 23.7	+10 19.8	+0.4545	0.5422	0.1513	+54	−19
B. Scorpii	5.7	+1.32	−11.1	−23 22.2	2 24.3	+11 18.3	−0.9012	0.5425	−0.1490	−18	−90

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

APRIL.

The Star's					At Conjunction in R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1912.0.		Apparent Declination.	Washington Mean Time.	Hour Angle, H	Y	x'	y'	N.	S.
		Δα	Δδ								
		s	"	° ′	d h m	h m				°	°
24 G. Scorpii	6.2	+1.32	-10.9	-24 13.8	**5** 3 11.2	-11 56.4	-0.0901	0.5427	-0.1473	+24	-50
27 G. Scorpii	5.8	1.32	11.0	23 27.2	3 35.4	-11 33.0	-0.9861	0.5428	0.1463	-24	-90
41 G. Scorpii	6.3	1.30	10.8	24 12.0	5 50.7	- 9 22.3	-0.5061	0.5435	0.1412	+ 3	-78
85 B. Scorpii	6.0	1.31	10.5	25 15.4	6 20.2	- 8 53.9	+0.5647	0.5437	0.1402	+59	-13
19 Scorpii	4.9	1.28	10.7	23 57.6	8 56.4	- 6 23.0	-1.1932	0.5443	0.1343	-41	-90
σ Scorpii	3.1	+1.29	-10.3	-25 23.1	9 9.9	- 6 10.0	+0.3161	0.5444	-0.1337	+44	-27
α Scorpii	1.2	1.26	9.9	26 14.4	12 49.9	- 2 37.5	+0.7667	0.5453	0.1250	+64	- 1
22 Scorpii	4.8	1.26	10.3	24 55.5	13 12.7	- 2 15.5	-0.7050	0.5453	0.1242	- 9	-90
116 B. Scorpii	6.2	1.26	9.9	26 21.0	13 42.7	- 1 46.5	+0.7759	0.5455	0.1230	+64	0
134 B. Scorpii	6.4	1.25	9.4	27 17.7	19 26.9	+ 3 45.8	+1.1347	0.5468	0.1094	+63	+28
118 B. Ophiuchi	6.2	+1.16	- 9.2	-26 23.8	**6** 5 28.5	-10 33.6	-0.8145	0.5485	-0.0849	-19	-90
95 G. Ophiuchi	6.1	1.15	8.7	27 39.4	7 53.6	- 8 13.5	+0.3610	0.5488	0.0785	+42	-24
36 Ophi. (*1st star*)	5.4	1.12	9.3	26 28.6	9 13.7	- 6 56.3	-1.0292	0.5489	0.0752	-34	-90
43 Ophiuchi	5.4	1.11	8.3	28 3.6	12 42.4	- 3 34.8	+0.4538	0.5491	0.0663	+45	-19
163 G. Ophiuchi	6.3	1.06	8.0	27 50.7	21 29.0	+ 4 53.2	-0.2668	0.5495	0.0439	+ 5	-61
X Sagittarii (*var.*)	4.4	+1.04	- 7.9	-27 48.0	23 21.6	+ 6 41.9	-0.3936	0.5494	-0.0389	- 1	-70
10 G. Sagittarii	5.7	1.00	7.6	28 3.2	**7** 3 22.3	+10 34.1	-0.2517	0.5493	0.0286	+ 5	-60
210 B. Scorpii	5.8	1.00	7.3	28 45.1	4 13.2	+11 23.2	+0.4918	0.5493	0.0264	+46	-16
38 B. Sagittarii	4.7	0.96	7.2	28 28.2	8 22.6	- 8 36.1	+0.0944	0.5490	0.0156	+21	-39
C. D. -28° 14268	6.4	0.94	6.9	28 55.4	10 4.8	- 6 57.5	+0.5702	0.5488	0.0112	+50	-12
48 G. Sagittarii	6.3	+0.91	- 7.0	-28 19.2	12 28.8	- 4 38.6	-0.1138	0.5484	-0.0050	+ 9	-51
62 B. Sagittarii	6.0	0.92	6.9	28 41.1	12 29.0	- 4 38.3	+0.2880	0.5484	-0.0050	+31	-28
58 G. Sagittarii	6.1	0.89	6.8	28 28.4	14 31.0	- 2 40.7	+0.0502	0.5482	+0.0002	+17	-41
τ Sagittarii	3.5	0.70	6.0	27 48.1	**8** 10 32.0	- 7 21.5	-0.1759	0.5436	0.0509	+10	-55
183 B. Sagittarii	6.2	0.71	5.5	28 46.5	10 46.2	- 7 7.7	+0.9119	0.5435	0.0515	+62	+10
234 B. Sagittarii	5.9	+0.62	- 5.4	-28 2.3	18 27.3	+ 0 17.6	+0.5656	0.5411	+0.0703	+54	-12
248 B. Sagittarii	5.7	0.62	5.5	27 10.1	20 54.6	+ 2 39.9	-0.2172	0.5402	0.0759	+10	-58
ω Sagittarii	4.8	0.48	5.1	26 32.1	**9** 8 50.5	- 9 48.2	+0.1570	0.5354	0.1037	+33	-35
b Sagittarii	4.6	0.48	4.7	27 24.3	9 21.0	- 9 18.8	+1.1727	0.5352	0.1047	+63	+32
A Sagittarii	4.9	0.46	5.0	26 26.1	10 17.9	- 8 23.7	+0.2003	0.5348	0.1069	+36	-33
40 B. Capricorni	6.2	+0.31	- 4.5	-25 14.6	**10** 2 18.0	+ 7 5.0	+0.8692	0.5276	+0.1407	+65	+ 5
56 B. Capricorni	6.3	0.27	4.6	24 5.8	5 48.2	+10 28.4	+0.1089	0.5261	0.1478	+35	-38
86 B. Capricorni	6.2	0.20	4.4	24 6.9	12 1.5	- 7 30.2	+1.0857	0.5232	0.1597	+66	+21
χ Capricorni	5.3	0.13	4.8	21 32.9	19 40.5	- 0 5.6	-0.4676	0.5197	0.1739	+ 9	-74
27 Capricorni	6.1	0.12	5.0	20 54.7	20 10.0	+ 0 23.0	-1.0847	0.5196	0.1745	-27	-90
φ Capricorni	5.3	+0.09	- 4.8	-21 1.1	23 10.7	+ 3 18.1	-0.4315	0.5182	+0.1798	+12	-71
33 Capricorni	5.3	0.05	4.5	21 13.7	**11** 3 25.4	+ 7 25.0	+0.5775	0.5164	0.1870	+65	-13
35 Capricorni	6.0	0.03	4.3	21 34.7	4 57.9	+ 8 54.6	+1.2546	0.5158	0.1896	+69	+36
128 B. Capricorni	6.5	+0.01	4.9	19 32.0	6 21.8	+10 15.9	-0.7287	0.5151	0.1920	- 2	-90
37 Capricorni	5.7	-0.01	4.5	20 28.7	8 48.1	-11 22.2	+0.7829	0.5141	0.1957	+70	- 2
ε Capricorni	4.7	-0.03	- 4.6	-19 51.7	9 55.8	-10 16.6	+0.3275	0.5137	+0.1975	+52	-27
κ Capricorni	4.8	0.05	4.7	19 16.1	12 45.3	- 7 32.1	+0.2403	0.5126	0.2017	+49	-31
143 B. Capricorni	6.1	0.05	4.4	20 1.5	13 2.3	- 7 15.7	+1.1269	0.5125	0.2020	+70	+22
152 B. Capricorni	6.5	0.11	5.1	17 15.4	16 37.7	- 3 46.8	-1.1735	0.5111	0.2075	-30	-90
154 B. Capricorni	6.1	0.10	4.5	19 2.1	17 21.6	- 3 4.1	+0.9283	0.5108	0.2085	+71	+ 7
161 B. Capricorni	6.4	-0.13	- 4.3	-18 19.7	22 45.4	+ 2 9.9	+1.2987	0.5089	+0.2160	+72	+38
29 Aquarii (*mean*)	6.5	0.14	4.6	17 23.4	22 53.9	+ 2 18.3	+0.3029	0.5089	0.2163	+54	-29
50 Aquarii	5.9	0.26	5.0	13 58.6	**12** 10 20.9	-10 35.0	-0.8604	0.5055	0.2309	- 5	-90
182 B. Aquarii	6.2	0.28	5.0	13 22.1	13 15.9	- 7 45.1	-0.8451	0.5048	0.2342	- 3	-90
56 Aquarii	6.1	0.28	4.5	15 2.2	13 23.9	- 7 37.4	+1.0044	0.5047	0.2343	+75	+11
70 Aquarii	6.1	-0.36	- 4.9	-11 1.3	23 1.2	+ 1 43.2	-1.0539	0.5027	+0.2446	-15	-90
74 Aquarii	5.8	0.37	4.5	12 5.2	**13** 1 38.8	+ 4 16.4	+0.7469	0.5023	0.2471	+78	- 5
ψ^1 Aquarii	4.5	0.47	4.5	9 34.1	13 33.3	- 8 9.7	+1.0275	0.5012	0.2570	+81	+11
χ Aquarii	5.3	0.49	4.8	8 12.5	14 5.4	- 7 38.5	-0.3019	0.5011	0.2575	+28	-61
ψ^2 *Aquarii*	4.6	0.48	4.4	9 39.9	14 38.7	- 7 6.1	+1.4112	0.5010	0.2579	+81	+50
Piscium	5.6	-0.61	- 4.6	- 3 15.1	**14** 6 40.0	+ 8 27.7	-1.2557	0.5014	+0.2678	-27	-90

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

APRIL.

The Star's							At Conjunction in R. A.					Limiting Parallels.	
Name.			Mag.	Red'ns from 1912.0. Δα	Red'ns from 1912.0. Δδ	Apparent Declination.	Washington Mean Time.	Hour Angle, H	Y	x'	y'	N.	S.
				s	"	° ′	d h m	h m				°	°
24		Piscium	6.1	-0.62	- 4.3	- 3 38.7	**14** 9 19.1	+11 2.2	-0.1235	0.5018	+0.2687	+38	-51
27		Piscium	5.1	0.63	4.1	4 2.7	12 22.7	- 9 59.5	+1.1280	0.5023	0.2698	+86	+18
29		Piscium	5.1	0.65	4.0	3 31.1	14 2.8	- 8 22.2	+1.0158	0.5025	0.2704	+87	+10
80	B.	Piscium	6.3	0.68	4.3	0 59.6	15 45.7	- 6 42.2	-1.2109	0.5028	0.2710	-23	-90
4		Ceti	6.3	0.67	3.9	3 2.4	17 10.6	- 5 19.8	+1.3533	0.5030	0.2715	+87	+38
5		Ceti	6.3	-0.67	- 3.9	- 2 56.3	17 25.5	- 5 5.3	+1.3122	0.5031	+0.2716	+88	+33
		VENUS	-3.3	....	....	+ 0 5.8	**15** 0 8.5	+ 1 26.0	-0.0842	0.4556	0.2523	+41	-49
						NEW	*MOON.*						
16		Tauri	5.4	-0.87	+ 5.6	+24 0.9	**19** 0 20.4	- 1 29.4	-1.2853	0.5685	+0.1786	-43	-66
17		Tauri	3.8	-0.87	+ 5.6	+23 50.3	0 22.3	- 1 27.5	-1.0998	0.5685	+0.1786	-22	-67
20		Tauri	4.1	0.87	5.7	24 5.7	0 45.7	- 1 5.1	-1.2915	0.5688	0.1778	-44	-66
23		Tauri	4.3	0.86	5.6	23 40.6	0 58.4	- 0 52.8	-0.8264	0.5690	0.1772	- 2	-67
η		Tauri	3.0	0.86	5.7	23 50.1	1 26.9	- 0 25.4	-0.9042	0.5694	0.1761	- 7	-67
104	B.	Tauri	5.5	0.85	5.6	23 9.2	1 48.8	- 0 4.3	-0.1440	0.5697	0.1753	+36	-39
27		Tauri	3.7	-0.85	+ 5.8	+23 47.2	2 8.4	+ 0 14.6	-0.7328	0.5700	+0.1745	+ 4	-67
28		Tauri	5.2	0.86	5.8	23 52.2	2 8.9	+ 0 15.1	-0.8168	0.5700	0.1745	- 1	-67
133	B.	Tauri	5.9	0.83	5.5	21 58.7	2 28.5	+ 0 33.9	+1.1706	0.5702	0.1739	+90	+36
33		Tauri	6.0	0.82	5.9	22 55.3	5 23.0	+ 3 21.8	+0.7040	0.5727	0.1670	+90	+ 6
161	B.	Tauri	6.5	0.80	6.1	22 57.3	6 57.7	+ 4 52.8	+0.9311	0.5740	0.1634	+90	+20
36		Tauri	5.6	-0.80	+ 6.4	+23 52.0	8 19.6	+ 6 11.6	+0.2239	0.5750	+0.1599	+58	-18
χ		Tauri	5.3	0.74	7.4	25 25.5	15 35.1	-10 49.8	-0.2684	0.5805	0.1407	+29	-41
62		Tauri	6.1	0.72	7.1	24 5.9	16 9.8	-10 16.5	+1.1609	0.5810	0.1391	+90	+39
17	B.	Aurigæ	6.0	0.62	8.8	27 45.2	**20** 3 19.7	+ 0 26.6	-1.1684	0.5884	0.1073	-32	-63
38	B.	Aurigæ	6.5	0.55	9.0	27 34.6	7 52.3	+ 4 48.2	-0.5291	0.5910	0.0941	+15	-52
47	B.	Aurigæ	6.0	-0.52	+ 9.3	+27 55.4	9 48.9	+ 6 40.0	-0.7033	0.5920	+0.0877	+ 4	-63
354	B.	Tauri	6.4	0.46	9.5	27 52.3	14 4.7	+10 45.2	-0.3040	0.5938	0.0745	+27	-38
22		Aurigæ	6.4	0.45	9.8	28 51.4	14 57.8	+11 36.2	-1.2371	0.5943	0.0715	-43	-62
β		Tauri	1.8	0.43	9.8	28 32.2	16 4.0	-11 20.4	-0.8360	0.5948	0.0681	- 5	-62
107	B.	Aurigæ	6.5	0.38	9.7	27 36.5	19 42.2	- 7 51.3	+0.3322	0.5962	0.0566	+65	- 3
112	B.	Aurigæ	5.7	-0.36	+ 9.5	+26 52.4	20 10.3	- 7 24.3	+1.1033	0.5963	+0.0550	+90	+43
116	B.	Aurigæ	5.9	0.36	10.2	29 10.1	20 56.6	- 6 40.0	-1.1792	0.5965	0.0527	-35	-61
406	B.	Tauri	5.6	0.28	10.0	27 56.7	**21** 1 19.3	- 2 28.3	+0.2575	0.5975	0.0380	+60	- 5
136		Tauri	4.6	0.27	9.9	27 35.7	2 12.4	- 1 37.4	+0.6445	0.5976	0.0352	+90	+15
154	B.	Aurigæ	6.4	0.25	10.3	28 55.9	3 23.4	- 0 29.4	-0.6691	0.5979	0.0313	+ 6	-59
415	B.	Tauri	6.1	-0.22	+10.0	+27 34.3	5 4.1	+ 1 7.0	+0.7554	0.5983	+0.0257	+90	+22
183	B.	Aurigæ	6.3	0.19	10.6	29 31.4	7 1.9	+ 2 59.9	-1.1752	0.5987	0.0194	-35	-61
κ		Aurigæ	4.4	0.13	10.6	29 32.1	10 22.8	+ 6 12.3	-1.1405	0.5987	0.0081	-31	-61
211	B.	Aurigæ	6.3	-0.08	10.7	29 35.1	12 32.3	+ 8 16.4	-1.1820	0.5987	+0.0009	-36	-61
49		Aurigæ	5.1	+0.02	10.3	28 5.7	17 46.0	-10 43.2	+0.2837	0.5986	-0.0168	+62	- 1
53		Aurigæ	5.6	+0.02	+10.6	+29 3.8	18 56.0	- 9 36.1	-0.7180	0.5986	-0.0208	+ 3	-61
54		Aurigæ	5.8	0.03	10.3	28 20.7	19 22.8	- 9 10.4	-0.0003	0.5985	0.0220	+44	-16
28		Geminorum	5.5	0.07	10.6	29 3.8	21 18.4	- 7 19.7	-0.7762	0.5980	0.0283	- 1	-61
47		Geminorum	5.6	0.25	9.6	27 0.3	**22** 7 17.7	+ 2 14.5	+0.8562	0.5955	0.0614	+90	+25
53		Geminorum	5.9	0.29	9.9	28 3.2	8 59.8	+ 3 52.3	-0.3137	0.5947	0.0667	+27	-37
134	B.	Geminorum	6.5	+0.29	+ 9.5	+26 51.1	9 25.7	+ 4 17.1	+0.8730	0.5946	-0.0678	+90	+25
59		Geminorum	5.7	0.35	9.7	27 48.7	12 14.9	+ 6 59.3	-0.3024	0.5933	0.0769	+27	-38
ι		Geminorum	3.9	0.36	9.7	27 58.6	12 41.6	+ 7 24.9	-0.5041	0.5931	0.0784	+16	-50
b^1		Geminorum	5.0	0.39	9.8	28 18.2	14 3.3	+ 8 43.2	-0.9443	0.5925	0.0826	-12	-62
b^2		Geminorum	5.0	0.39	9.7	28 6.1	14 14.2	+ 8 53.7	-0.7553	0.5924	0.0830	+ 1	-62
υ		Geminorum	4.3	+0.43	+ 9.2	+27 5.7	16 34.5	+11 8.2	+0.0590	0.5913	-0.0905	+48	-20
c		Geminorum	5.5	0.46	8.7	25 59.8	19 43.2	- 9 50.9	+0.8690	0.5898	0.1002	+90	+23
φ		Geminorum	5.0	0.54	8.9	26 59.8	23 18.9	- 6 23.9	-0.5228	0.5875	0.1107	+15	-54
ω		Cancri	5.9	0.58	8.2	25 38.2	**23** 2 12.6	- 3 37.1	+0.5190	0.5857	0.1192	+79	+ 1
4		Cancri	6.2	0.58	8.1	25 20.1	2 31.6	- 3 18.9	+0.7865	0.5855	0.1202	+90	+1
ψ		*Cancri*	5.9	+0.65	+ 7.9	+25 46.6	5 55.4	- 0 3.3	-0.0874	0.5834	-0.1301	+39	-

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

APRIL.

THE STAR'S							AT CONJUNCTION IN R. A.						Limiting Parallels.	
Name.			Mag.	Red'ns from 1912.0. Δα	Red'ns from 1912.0. Δδ	Apparent Declination.	Washington Mean Time.		Hour Angle, *H*	*Y*	*x'*	*y'*	N.	S.
				s	"	° ′	d	h m	h m				°	°
λ		Cancri	5.9	+0.70	+ 7.1	+24 18.1	**23**	9 54.5	+ 3 46.3	+0.8648	0.5806	−0.1408	+90	+18
28		Cancri	6.1	0.76	6.9	24 26.4		13 6.8	+ 6 51.1	+0.2592	0.5783	0.1495	+60	−15
*ι*¹		Cancri	5.7	0.78	6.8	24 22.8		14 16.3	+ 7 57.8	+0.1440	0.5774	0.1526	+53	−21
*ι*²		Cancri	6.4	0.79	6.7	24 23.2		14 52.1	+ 8 32.2	+0.0458	0.5770	0.1541	+47	−27
194	B.	Cancri (*2d star*)	6.3	0.99	5.1	23 20.2	**24**	4 56.4	− 1 55.8	−1.3086	0.5661	0.1880	−46	−67
ξ		Cancri	5.2	+0.99	+ 4.6	+22 24.2		5 44.4	− 1 9.6	−0.5137	0.5655	−0.1900	+16	−60
79		Cancri	6.1	1.00	4.6	22 21.3		6 9.2	− 0 45.7	−0.5443	0.5652	0.1908	+15	−62
90	H¹	Cancri	6.1	1.01	4.2	21 38.8		7 31.8	+ 0 33.8	−0.0913	0.5640	0.1939	+39	−37
57	B.	Leonis	6.5	1.15	+ 2.0	19 16.1		20 44.7	−10 42.1	−0.4166	0.5537	0.2196	+22	−58
107	B.	Leonis	6.3	1.23	− 0.1	16 11.2	**25**	6 6.9	− 1 39.6	+0.5840	0.5465	0.2352	+82	− 8
η		Leonis	3.6	+1.26	+ 0.2	+17 11.5		6 50.4	− 0 57.7	−0.6109	0.5460	−0.2364	+13	−71
42		Leonis	6.1	1.31	− 1.2	15 25.2		13 24.4	+ 5 22.9	−0.3884	0.5415	0.2452	+24	−61
46		Leonis	5.8	1.35	2.0	14 35.3		18 9.4	+ 9 58.3	−0.7233	0.5383	0.2514	+ 6	−76
l		Leonis	5.3	1.37	3.9	11 0.6	**26**	2 6.6	− 6 20.5	+0.8939	0.5336	0.2597	+90	+ 5
308	B.	Leonis	5.8	1.46	5.8	8 32.4		13 53.1	+ 5 3.2	+0.2959	0.5274	0.2697	+61	−28
b		Virginis	5.2	+1.58	− 9.0	+ 4 8.6	**27**	12 20.1	+ 2 47.9	−1.3810	0.5197	−0.2791	−42	−86
10		Virginis	6.2	1.59	9.8	+ 2 23.4		17 10.1	+ 7 29.0	−0.9270	0.5186	0.2798	− 4	−88
13		Virginis	5.9	1.59	10.7	− 0 18.1		21 38.4	+11 49.1	+0.5974	0.5179	0.2798	+82	−14
η		Virginis	4.0	1.60	10.7	0 10.8		22 15.7	−11 34.7	+0.2993	0.5179	0.2797	+61	−29
38		Virginis	6.1	1.67	12.3	3 4.7	**28**	14 54.6	+ 4 33.5	−1.3388	0.5172	0.2757	−36	−90
91	G.	Virginis	6.5	+1.67	−12.4	− 3 44.9		15 7.1	+ 4 45.7	−0.6998	0.5172	−0.2756	+ 8	−90
h		Virginis	5.4	1.74	14.0	9 42.9	**29**	10 42.4	− 0 15.1	+0.2226	0.5196	0.2631	+55	−33
86		Virginis	5.6	1.76	14.4	11 59.4		17 6.3	+ 5 56.9	+0.9391	0.5210	0.2575	+79	+ 6
621	B.	Virginis	6.4	1.79	14.7	14 33.2	**30**	2 10.0	− 9 16.2	+1.3443	0.5237	0.2475	+76	+42

MAY.

ι		Libræ (*var.*)	4.7	+1.90	−14.4	−19 27.8	**1**	10 28.7	− 1 59.8	−0.7357	0.5357	−0.1993	− 3	−90
25		Libræ	6.0	1.89	14.3	19 19.2		10 59.6	− 1 29.9	−0.9904	0.5359	0.1984	−18	−90
147	B.	Libræ	6.2	1.92	14.0	20 25.8		18 58.9	+ 6 13.5	−1.3354	0.5391	0.1835	−56	−90
169	B.	Libræ	6.0	+1.94	−13.7	−22 51.2		22 15.1	+ 9 23.1	+0.6708	0.5404	−0.1768	+68	− 8
177	B.	Libræ	6.2	1.94	13.6	22 52.0		22 57.9	+10 4.5	+0.5593	0.5407	0.1753	+62	−14
42		Libræ	5.0	1.95	13.6	23 32.2		23 22.6	+10 28.3	+1.2053	0.5408	0.1743	+67	+32
31	B.	Scorpii	5.4	1.95	13.1	24 16.5	**2**	5 33.8	− 7 33.0	+0.9609	0.5432	0.1616	+66	+11
32	B.	Scorpii	5.3	1.95	13.2	23 43.2		5 35.2	− 7 31.6	+0.3601	0.5432	0.1616	+49	−25
40	B.	Scorpii	5.4	+1.96	−12.9	−24 34.9		7 40.6	− 5 30.4	+0.9539	0.5440	−0.1570	+66	+11
50	B.	Scorpii	6.4	1.95	12.8	24 29.3		10 5.1	− 3 10.9	+0.4823	0.5448	0.1516	+55	−18
57	B.	Scorpii	5.7	1.94	12.9	23 22.2		11 5.4	− 2 12.7	−0.8732	0.5451	0.1494	−17	−90
24	G.	Scorpii	6.2	1.95	12.7	24 13.8		11 52.1	− 1 27.6	−0.0617	0.5454	0.1475	+26	−48
27	G.	Scorpii	5.8	1.94	12.8	23 27.3		12 16.1	− 1 4.4	−0.9574	0.5455	0.1467	−22	−90
41	G.	Scorpii	6.3	+1.95	−12.5	−24 12.1		14 30.7	+ 1 5.6	−0.4768	0.5463	−0.1416	+ 4	−75
85	B.	Scorpii	6.0	1.96	12.4	25 15.5		15 0.1	+ 1 34.0	+0.5937	0.5464	0.1405	+61	−11
19		Scorpii	4.9	1.94	12.4	23 57.7		17 35.5	+ 4 4.0	−1.1628	0.5473	0.1348	−39	−90
σ		Scorpii	3.1	1.95	12.1	25 23.1		17 48.9	+ 4 16.9	+0.3463	0.5473	0.1342	+46	−25
α		Scorpii	1.2	1.98	11.8	26 14.4		21 27.6	+ 7 48.1	+0.7975	0.5484	0.1254	+64	+ 1
22		Scorpii	4.8	+1.96	−12.0	−24 55.5		21 50.3	+ 8 10.0	−0.6727	0.5485	−0.1245	− 8	−90
116	B.	Scorpii	6.2	1.98	11.7	26 21.0		22 20.1	+ 8 38.8	+0.8070	0.5486	0.1234	+64	+ 2
134	B.	Scorpii	6.4	1.97	11.1	27 17.7	**3**	4 2.0	− 9 51.3	+1.1676	0.5501	0.1098	+63	+31
118	B.	Ophiuchi	6.2	1.93	10.3	26 23.9		13 59.2	− 0 15.1	−0.7759	0.5519	0.0849	−17	−90
95	G.	Ophiuchi	6.1	1.94	9.9	27 39.4		16 23.2	+ 2 3.9	+0.3988	0.5523	0.0788	+44	−22
36		Ophi. (*1st star*)	5.4	+1.90	−10.4	−26 28.6		17 42.7	+ 3 20.5	−0.9886	0.5525	−0.0754	−32	−90
43		Ophiuchi	5.4	1.95	9.3	28 3.7		21 9.8	+ 6 40.3	+0.4931	0.5528	0.0665	+48	−16
163	G.	Ophiuchi	6.3	1.90	8.5	27 50.7	**4**	5 52.1	− 8 55.8	−0.2231	0.5532	0.0437	+ 8	−58
X		Sagittarii (*var.*)	4.4	1.88	8.3	27 48.1		7 43.8	− 7 8.2	−0.3488	0.5531	0.0390	0	−66
10	G.	Sagittarii	5.7	1.86	7.8	28 3.2		11 42.7	− 3 17.7	−0.2058	0.5528	0.0286	+ 7	−
210	*B.*	*Scorpii*	5.8	+1.87	− 7.6	−28 45.1		12 33.2	− 2 28.9	+0.5365	0.5527	−0.0264	+48	

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

MAY.

The Star's					At Conjunction in R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1912.0. Δα	Red'ns from 1912.0. Δδ	Apparent Declination.	Washington Mean Time.	Hour Angle, H	Y	x'	y'	N.	S.
		s	"	° '	d h m	h m				°	°
38 B. Sagittarii	4.7	+1.84	−7.2	−28 28.2	4 16 40.6	+ 1 29.7	+0.1412	0.5524	−0.0154	+24	−36
C.D.−28° 14268	6.4	1.83	6.9	28 55.4	18 22.1	+ 3 7.6	+0.6167	0.5522	0.0110	+53	− 9
48 G. Sagittarii	6.3	1.84	6.9	28 19.2	20 45.0	+ 5 25.5	−0.0650	0.5518	0.0047	+12	−48
62 B. Sagittarii	6.0	1.84	6.7	28 41.0	20 45.3	+ 5 25.7	+0.3360	0.5518	−0.0047	+33	−25
58 G. Sagittarii	6.1	1.82	6.5	28 28.3	22 46.4	+ 7 22.5	+0.0993	0.5514	+0.0005	+20	−39
τ Sagittarii	3.5	+1.63	−4.6	−27 48.1	5 18 40.2	+ 2 34.6	−0.1196	0.5460	+0.0513	+14	−51
183 B. Sagittarii	6.2	1.68	4.2	28 46.5	18 54.3	+ 2 48.2	+0.9668	0.5459	0.0519	+62	+14
234 B. Sagittarii	5.9	1.59	3.5	28 2.2	6 2 33.6	+10 11.7	+0.6239	0.5428	0.0705	+57	− 9
248 B. Sagittarii	5.7	1.55	3.5	27 10.0	5 0.4	+11 26.6	−0.1575	0.5417	0.0766	+14	−54
ω Sagittarii	4.8	1.42	2.5	26 32.1	16 54.9	+ 0 3.9	+0.2200	0.5362	0 1040	+37	−32
b Sagittarii	4.6	+1.42	−2.2	−27 24.3	17 25.4	+ 0 33.4	+1.2362	0.5359	+0.1051	+63	+41
A Sagittarii	4.9	1.40	2.4	26 26.1	18 22.2	+ 1 28.3	+0.2640	0.5354	0.1073	+39	−29
40 B. Capricorni	6.2	1.23	1.1	25 14.5	7 10 23.3	− 7 2.0	+0.9382	0.5271	0.1407	+65	+10
56 B. Capricorni	6.3	1.18	1.0	24 5.8	13 54.2	− 3 37.8	+0.1780	0.5252	0.1478	+38	−35
86 B. Capricorni	6.2	1.13	0.5	24 6.8	20 9.0	+ 2 25.1	+1.1577	0.5219	0.1597	+66	+27
χ Capricorni	5.3	+1.01	−0.7	−21 32.9	8 3 50.4	+ 9 52.1	−0.3968	0.5180	+0.1733	+13	−69
27 Capricorni	6.1	1.00	0.9	20 54.6	4 20.0	+10 20.8	−1.0151	0.5178	0.1742	−22	−90
φ Capricorni	5.3	0.96	0.6	21 1.1	7 22.0	−10 42.8	−0.3604	0.5163	0.1794	+15	−66
33 Capricorni	5.3	0.91	−0.2	21 13.6	11 38.4	− 6 34.3	+0.6519	0.5142	0.1862	+68	− 9
35 Capricorni	6.0	0.90	+0.1	21 34.7	13 11.6	− 5 3.9	+1.3311	0.5134	0.1887	+69	+48
128 B. Capricorni	6.5	+0.86	−0.5	−19 31.9	14 36.2	− 3 41.9	−0.6574	0.5127	+0.1910	0	−90
37 Capricorni	5.7	0.84	0.0	20 28.6	17 3.7	− 1 18.8	+0.8588	0.5116	0.1948	+70	+ 3
ε Capricorni	4.7	0.82	−0.1	19 51.7	18 12.0	− 0 12.6	+0.4023	0.5110	0.1967	+57	−23
κ Capricorni	4.8	0.81	0.0	19 16.1	21 3.0	+ 2 33.3	+0.3148	0.5098	0.2007	+52	−27
143 B. Capricorni	6.1	0.82	+0.3	20 1.4	21 20.1	+ 2 49.9	+1.2045	0.5096	0.2012	+70	+29
152 B. Capricorni	6.5	+0.74	−0.4	−17 15.4	9 0 57.6	+ 6 21.0	−1.1028	0.5081	+0.2063	−24	−90
154 B. Capricorni	6.1	0.76	+0.3	19 2.0	1 41.9	+ 7 4.0	+1.0053	0.5078	0.2073	+71	+12
161 B. Capricorni	6.4	0.69	0.4	18 19.6	7 8.9	−11 38.7	+1.3782	0.5056	0.2148	+72	+55
29 Aquarii (*mean*)	6.5	0.67	+0.1	17 23.3	7 17.4	−11 30.4	+0.3783	0.5055	0.2151	+58	−24
50 Aquarii	5.9	0.51	−0.2	13 58.5	18 52.0	− 0 16.0	−0.7898	0.5017	0.2293	0	−90
182 B. Aquarii	6.2	+0.50	−0.1	−13 22.0	21 49.0	+ 2 35.9	−0.7743	0.5010	+0.2325	0	−90
56 Aquarii	6.1	0.51	+0.5	15 2.2	21 57.1	+ 2 43.7	+1.0819	0.5009	0.2326	+75	+16
70 Aquarii	6.1	0.37	−0.2	11 1.2	10 7 41.2	−11 48.9	−0.9852	0.4987	0.2426	−10	−90
74 Aquarii	5.8	0.35	+0.4	12 5.1	10 20.7	− 9 14.0	+0.8218	0.4983	0.2449	+78	− 1
ψ^1 Aquarii	4.5	0.24	0.5	9 34.0	22 23.8	+ 2 28.7	+1.1003	0.4972	0.2547	+81	+16
χ Aquarii	5.3	+0.21	+0.1	− 8 12.4	22 56.3	+ 3 0.3	−0.2341	0.4971	+0.2552	+31	−57
20 Piscium	5.6	+0.01	−0.4	3 15.1	11 15 42.0	− 4 42.4	−1.1976	0.4979	0.2650	−22	−90
24 Piscium	6.1	−0.02	−0.1	3 38.7	18 22.7	− 2 6.3	−0.0625	0.4982	0.2666	+41	−48
27 Piscium	5.1	0.02	+0.4	4 2.6	21 28.1	+ 0 53.8	+1.1899	0.4988	0.2676	+86	+22
29 Piscium	5.1	0.03	+0.4	3 31.0	23 9.1	+ 2 32.0	+1.0772	0.4992	0.2681	+87	+14
80 B. Piscium	6.3	−0.07	−0.2	− 0 59.5	12 0 53.0	+ 4 12.9	−1.1558	0.4996	+0.2687	−18	−90
4 Ceti	6.3	0.07	+0.5	3 2.3	2 18.7	+ 5 36.3	+1.4129	0.4999	0.2691	+87	+48
5 Ceti	6.3	0.07	+0.5	− 2 56.2	2 33.7	+ 5 50.8	+1.3721	0.5000	0.2692	+88	+41
44 Piscium	6.0	0.19	−0.1	+ 1 27.1	11 41.3	− 9 17.3	−0.8312	0.5028	0.2710	+ 1	−89
147 B. Piscium	5.9	0.27	−0.4	4 49.7	23 39.3	+ 2 19.8	−1.1447	0.5078	0.2712	−19	−86
155 B. Piscium	6.5	−0.28	+0.6	+ 2 54.5	13 1 12.7	+ 3 50.4	+1.3017	0.5086	+0.2710	+90	+32
171 B. Piscium	6.3	0.35	0.2	6 0.5	5 34.8	+ 8 4.7	−0.7777	0.5107	0.2705	+ 3	−84
73 Piscium	6.2	0.36	0.6	5 11.1	8 9.6	+10 34.9	+0.7845	0.5122	0.2698	+90	− 3
e Piscium	5.6	0.38	0.6	5 11.1	9 56.8	−11 41.1	+1.2656	0.5133	0.2691	+90	+29
ζ Piscium	5.6	0.40	0.5	7 6.6	12 37.6	− 9 5.1	−0.0311	0.5150	0.2680	+43	−45
88 Piscium	6.2	−0.40	+0.6	+ 6 31.8	13 7.7	− 8 35.9	+0.7104	0.5153	+0.2678	+90	− 7
				NEW	*MOON.*						
406 B. Tauri	5.6	−0.44	+9.0	+27 56.7	18 8 39.1	+ 6 39.1	+0.1818	0.6070	+0.0378	+55	− 9
136 Tauri	4.6	0.43	9.0	27 35.7	9 30.7	+ 7 28.5	+0.5632	0.6071	0.0349	+85	+1
154 *B. Aurigæ*	6.4	−0.43	+9.3	+28 55.9	10 39.8	+ 8 34.6	−0.7348	0.6073	+0.0308	+ 2	−

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

MAY.

THE STAR'S					AT CONJUNCTION IN R. A.						Limiting Parallels.	
Name.	Mag.	Red'ns from 1912.0.		Apparent Declination.	Washington Mean Time.		Hour Angle, H	Y	x'	y'	N.	S.
		Δα	Δδ									
		s	"	° '	d	h m	h m				°	°
415 B. Tauri	6.1	-0.40	+ 9.1	+27 34.3	**18**	12 17.7	+10 8.2	+0.6708	0.6075	+0.0254	+90	+17
183 B. Aurigæ	6.3	0.38	9.5	29 31.4		14 12.3	+11 57.9	-1.2371	0.6077	0.0187	-45	-61
κ Aurigæ	4.4	0.34	9.6	29 32.0		17 27.8	- 8 55.1	-1.2053	0.6081	+0.0075	-39	-61
211 B. Aurigæ	6.3	0.31	9.7	29 35.1		19 33.7	- 6 54.7	-1.2477	0.6082	0.0000	-47	-61
49 Aurigæ	5.1	0.24	9.5	28 5.7	**19**	0 39.0	- 2 2.6	+0.1953	0.6074	-0.0175	+56	- 7
53 Aurigæ	5.6	-0.22	+ 9.8	+29 3.8		1 47.2	- 0 57.3	-0.7947	0.6073	-0.0217	- 2	-61
54 Aurigæ	5.8	0.22	9.6	28 20.7		2 13.3	- 0 32.3	-0.0863	0.6072	0.0229	+39	-21
28 Geminorum	5.5	0.19	9.8	29 3.8		4 5.8	+ 1 15.3	-0.8541	0.6069	0.0296	- 6	-61
47 Geminorum	5.6	0.04	9.3	27 0.3		13 49.9	+10 34.3	+0.7514	0.6036	0.0626	+90	+19
53 Geminorum	5.9	0.01	9.6	28 3.2		15 29.5	-11 50.5	-0.4060	0.6029	0.0682	+21	-42
134 B. Geminorum	6.5	-0.01	+ 9.2	+26 51.1		15 54.8	-11 26.2	+0.7667	0.6027	-0.0694	+90	+19
59 Geminorum	5.7	+0.04	9.5	27 48.7		18 39.8	- 8 48.2	-0.3973	0.6016	0.0787	+22	-44
ι Geminorum	3.9	0.04	9.5	27 58.6		19 6.0	- 8 23.2	-0.5969	0.6013	0.0803	+10	-56
b^1 Geminorum	5.0	0.06	9.5	28 18.2		20 25.7	- 7 6.8	-1.0330	0.6005	0.0844	-19	-62
b^2 Geminorum	5.0	0.06	9.5	28 6.1		20 36.4	- 6 56.5	-0.8463	0.6003	0.0852	- 5	-62
υ Geminorum	4.3	+0.10	+ 9.1	+27 5.7		22 53.4	- 4 45.3	-0.0428	0.5989	-0.0923	+42	-25
ε Geminorum	5.5	0.14	8.8	25 59.8	**20**	1 57.9	- 1 48.7	+0.7565	0.5970	0.1017	+90	+16
φ Geminorum	5.0	0.20	9.0	26 59.8		5 28.9	+ 1 33.6	-0.6230	0.5948	0.1127	+ 9	-60
ω Cancri	5.9	0.24	8.4	25 38.2		8 19.0	+ 4 16.7	+0.4064	0.5926	0.1213	+70	- 5
4 Cancri	6.2	0.24	8.3	25 20.1		8 37.6	+ 4 34.5	+0.6714	0.5924	0.1223	+90	+ 8
ψ Cancri	5.9	+0.30	+ 8.2	+25 46.6		11 57.4	+ 7 46.1	-0.1962	0.5898	-0.1315	+33	-37
λ Cancri	5.9	0.35	7.7	24 18.1		15 51.9	+11 31.1	+0.7450	0.5866	0.1428	+90	+10
28 Cancri	6.1	0.40	7.5	24 26.4		19 0.7	- 9 27.7	+0.1433	0.5841	0.1516	+53	-21
υ¹ Cancri	5.7	0.41	7.4	24 22.8		20 9.1	- 8 22.0	+0.0282	0.5830	0.1546	+46	-27
υ² Cancri	6.4	0.42	7.4	24 23.2		20 44.2	- 7 48.3	-0.0692	0.5825	0.1561	+40	-32
ξ Cancri	5.2	+0.64	+ 5.7	+22 24.2	**21**	11 23.6	+ 6 17.1	-0.6328	0.5691	-0.1911	+10	-66
79 Cancri	6.1	0.64	5.7	22 21.4		11 48.1	+ 6 40.6	-0.6628	0.5688	0.1918	+ 8	-67
90 H¹. Cancri	6.1	0.66	5.3	21 38.9		13 9.8	+ 7 59.3	-0.2137	0.5675	0.1949	+33	-44
57 B. Leonis	6.5	0.81	3.4	19 16.2	**22**	2 15.5	- 3 23.9	-0.5423	0.5554	0.2202	+15	-65
107 B. Leonis	6.3	0.90	1.5	16 11.2		11 35.1	+ 5 35.9	+0.4534	0.5474	0.2350	+72	-15
η Leonis	3.6	+0.93	+ 1.8	+17 11.6		12 18.4	+ 6 17.7	-0.7386	0.5468	-0.2360	+ 5	-73
37 Leonis	5.5	0.95	0.3	14 10.1		16 31.8	+10 22.3	+1.3240	0.5432	0.2422	+90	+43
42 Leonis	6.1	0.99	+ 0.5	15 25.2		18 51.6	-11 22.6	-0.5175	0.5413	0.2454	+17	-68
46 Leonis	5.8	1.03	- 0.1	14 35.4		23 36.7	- 6 47.1	-0.8527	0.5377	0.2506	- 1	-76
l Leonis	5.3	1.09	2.2	11 0.6	**23**	7 35.1	+ 0 55.4	+0.7647	0.5320	0.2591	+90	- 2
308 B. Leonis	5.8	+1.19	- 4.1	+ 8 32.5		19 25.6	-11 36.9	+0.1699	0.5247	-0.2682	+54	-34
σ Leonis	4.1	1.21	5.1	6 30.6		22 53.4	- 8 15.6	+1.3237	0.5231	0.2699	+90	+36
10 Virginis	6.2	1.42	8.4	+ 2 23.4	**24**	23 0.5	- 8 53.2	-1.0440	0.5144	0.2765	-14	-88
13 Virginis	5.9	1.44	9.5	- 0 18.0	**25**	3 32.6	- 4 29.4	+0.4922	0.5135	0.2765	+74	-19
η Virginis	4.0	1.44	9.5	0 10.8		4 10.4	- 3 52.7	+0.1931	0.5133	0.2764	+55	-34
38 Virginis	6.1	+1.58	-11.4	- 3 4.7		21 5.1	-11 28.5	-1.4405	0.5122	-0.2721	-58	-90
91 G. Virginis	6.5	1.58	11.6	3 44.9		21 17.8	-11 16.2	-0.7969	0.5122	0.2720	+ 3	-90
h Virginis	5.4	1.74	14.0	9 42.9	**26**	17 12.9	+ 8 2.9	+0.1545	0.5146	0.2596	+51	-36
86 Virginis	5.6	1.79	14.6	11 59.4		23 43.1	- 9 38.7	+0.8841	0.5163	0.2537	+79	+ 3
621 B. Virginis	6.4	1.87	15.2	14 33.2	**27**	8 55.7	- 0 43.0	+1.3041	0.5190	0.2442	+76	+36
ι Libræ (*var.*)	4.7	+2.15	-15.4	-19 27.8		17 41.3	+ 7 0.5	-0.7447	0.5328	-0.1970	- 3	-90
25 Libræ	6.0	2.15	15.4	19 19.3		18 12.5	+ 7 30.7	-1.0002	0.5330	0.1960	-19	-90
147 B. Libræ	6.2	2.22	15.1	20 25.8	**29**	2 16.9	- 8 40.9	-1.3351	0.5367	0.1809	-57	-90
169 B. Libræ	6.0	2.26	15.1	22 51.3		5 35.0	- 5 29.4	+0.6861	0.5382	0.1747	+68	- 7
177 B. Libræ	6.2	2.27	15.0	22 52.0		6 18.2	- 4 47.6	+0.5749	0.5385	0.1733	+63	-13
42 Libræ	5.0	+2.28	15.0	-23 32.2		6 43.1	- 4 23.5	+1.2249	0.5388	-0.1724	+67	+34
31 B. Scorpii	5.4	2.32	14.6	24 16.5		12 57.5	+ 1 38.3	+0.9877	0.5415	0.1593	+66	+13
32 B. Scorpii	5.3	2.32	14.6	23 43.2		12 59.0	+ 1 39.8	+0.3840	0.5415	0.1593	+51	-23
40 B. Scorpii	5.4	2.34	14.4	24 34.9		15 5.4	+ 3 42.0	+0.9838	0.5424	0.1548	+66	+13
50 B. Scorpii	6.4	2.35	14.2	24 29.3		17 30.9	+ 6 2.5	+0.5127	0.5434	0.1498	+57	-16
57 B. Scorpii	5.7	+2.34	-14.1	-23 22.2		18 31.7	+ 7 1.2	-0.8468	0.5438	-0.1478	-15	-90

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

MAY.

THE STAR'S					AT CONJUNCTION IN R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1912.0.		Apparent Declination.	Washington Mean Time.	Hour Angle, *H*	*Y*	*x'*	*y'*	N.	S.
		Δα	Δδ								
		s	"	° '	d h m	h m				°	°
G. Scorpii	6.2	+2.37	-14.1	-24 13.9	**29** 19 18.6	+ 7 46.6	-0.0313	0.5442	-0.1459	+28	-46
G. Scorpii	5.8	2.36	14.0	23 27.3	19 42.9	+ 8 10.0	-0.9300	0.5443	0.1451	-20	-90
G. Scorpii	6.3	2.38	13.9	24 12.1	21 58.3	+10 20.8	-0.4441	0.5452	0.1399	+ 6	-73
B. Scorpii	6.0	2.40	13.9	25 15.5	22 27.9	+10 49.4	+0.6314	0.5454	0.1388	+63	- 9
Scorpii	4.9	2.39	13.6	23 57.7	**30** 1 4.2	-10 39.6	-1.1285	0.5463	0.1328	-35	-90
Scorpii	3.1	+2.42	-13.6	-25 23.2	1 17.7	-10 26.6	+0.3868	0.5464	-0.1322	+48	-23
Scorpii	1.2	2.45	13.2	26 14.5	4 57.6	- 6 54.3	+0.8447	0.5478	0.1240	+64	+ 4
Scorpii	4.8	2.43	13.2	24 55.5	5 20.4	- 6 32.2	-0.6308	0.5479	0.1232	- 6	-90
B. Scorpii	6.2	2.45	13.1	26 21.0	5 50.4	- 6 3.2	+0.8555	0.5481	0.1218	+64	+ 5
B. Scorpii	6.4	2.49	12.5	27 17.7	11 33.8	- 0 31.8	+1.2246	0.5498	0.1082	+63	+39
B. Ophiuchi	6.2	+2.52	-11.4	-26 23.9	21 33.0	+ 9 6.4	-0.7114	0.5523	-0.0837	-14	-90
G. Ophiuchi	6.1	2.55	11.0	27 39.4	23 57.4	+11 25.8	+0.4692	0.5527	0.0776	+48	-18
Ophi. (*1st star*)	5.4	2.51	11.3	26 28.7	**31** 1 17.1	-11 17.4	-0.9198	0.5529	0.0739	-28	-90
Ophiuchi	5.4	2.56	10.3	28 3.7	4 44.5	- 7 57.3	+0.5698	0.5535	0.0653	+53	-12
G. Ophiuchi	6.3	2.56	9.1	27 50.7	13 27.4	+ 0 27.1	-0.1367	0.5541	0.0425	+12	-52
Sagittarii (*var.*)	4.4	+2.56	- 8.9	-27 48.0	15 19.1	+ 2 14.8	-0.2602	0.5542	-0.0378	+ 5	-60
G. Sagittarii	6.2	2.54	8.9	26 56.8	15 43.7	+ 2 38.6	-1.2117	0.5542	0.0366	-53	-90
G. Sagittarii	5.7	2.58	8.3	28 3.2	19 18.0	+ 6 5.3	-0.1119	0.5543	0.0272	+12	-51
B. Scorpii	5.8	+2.60	- 8.1	-28 45.1	20 8.6	+ 6 54.1	+0.6329	0.5542	-0.0249	+55	- 8
JUNE.											
B. Sagittarii	4.7	+2.58	- 7.5	-28 28.2	**1** 0 16.0	+10 52.6	+0.2422	0.5538	-0.0142	+29	-31
C. D. -28° 14268	6.4	2.59	7.2	28 55.4	1 57.4	-11 29.5	+0.7206	0.5536	0.0098	+62	- 2
G. Sagittarii	6.3	2.58	7.0	28 19.2	4 20.2	- 9 11.8	+0.0407	0.5534	0.0035	+16	-42
B. Sagittarii	6.0	+2.58	- 6.8	-28 41.0	4 20.4	- 9 11.6	+0.4423	0.5534	-0.0035	+40	-19
G. Sagittarii	6.1	2.57	6.5	28 28.3	6 21.5	- 7 14.8	+0.2077	0.5532	+0.0018	+26	-32
Sagittarii	3.3	2.50	5.1	27 5.0	16 47.2	+ 2 49.0	-1.1644	0.5508	0.0289	-49	-90
Sagittarii	3.5	2.49	3.6	27 48.1	**2** 2 14.0	+11 56.1	+0.0123	0.5477	0.0524	+21	-44
B. Sagittarii	6.2	2.52	3.3	28 46.4	2 28.1	-11 50.3	+1.1005	0.5476	0.0530	+62	+26
B. Sagittarii	5.9	+2.45	- 2.3	-28 2.2	10 6.8	- 4 27.4	+0.7661	0.5445	+0.0718	+62	0
B. Sagittarii	5.7	2.41	2.1	27 10.0	12 33.6	- 2 5.6	-0.0135	0.5434	0.0775	+22	-45
Sagittarii	4.8	2.34	0.4	26 32.0	**3** 0 27.8	+ 9 24.5	+0.3780	0.5375	0.1052	+46	-23
Sagittarii	4.9	2.32	- 0.2	26 26.1	1 55.1	+10 48.9	+0.4235	0.5367	0.1084	+48	-21
B. Capricorni	6.2	2.15	+ 1.8	25 14.5	17 57.3	+ 2 19.6	+1.1156	0.5278	0.1419	+65	+24
B. Capricorni	6.3	+2.13	+ 2.3	-24 5.7	21 28.6	+ 5 44.2	+0.3574	0.5258	+0.1487	+48	-25
Capricorni	5.3	1.92	3.1	21 32.8	**4** 11 27.9	- 4 42.7	-0.2065	0.5178	0.1737	+22	-56
Capricorni	6.1	1.91	2.9	20 54.6	11 57.7	- 4 13.8	-0.8262	0.5175	0.1745	-11	-90
Capricorni	5.3	1.87	3.4	21 1.0	15 0.6	- 1 16.5	-0.1671	0.5157	0.1796	+26	-54
Capricorni	5.3	1.86	4.0	21 13.5	19 18.6	+ 2 53.7	+0.8525	0.5134	0.1865	+69	+ 3
B. Capricorni	6.5	+1.80	+ 3.9	-19 31.9	22 17.6	+ 5 47.3	-0.4600	0.5118	+0.1911	+12	-73
Capricorni	5.7	1.79	4.5	20 28.6	**5** 0 46.0	+ 8 11.2	+1.0639	0.5105	0.1947	+70	+17
Capricorni	4.7	1.76	4.4	19 51.6	1 54.9	+ 9 18.0	+0.6063	0.5099	0.1965	+69	-12
Capricorni	4.8	1.72	4.5	19 16.0	4 47.1	-11 54.9	+0.5207	0.5084	0.2007	+64	-16
B. Capricorni	6.5	1.64	4.3	17 15.3	8 43.7	- 8 5.3	-0.9008	0.5064	0.2062	-10	-90
B. Capricorni	6.1	+1.67	+ 4.9	-19 1.9	9 28.5	- 7 21.7	+1.2170	0.5061	+0.2071	+71	+30
Aquarii (*mean*)	6.5	1.57	5.0	17 23.3	15 7.2	- 1 53.0	+0.5906	0.5036	0.2143	+70	-13
Aquarii	6.2	1.50	4.7	14 37.6	20 25.2	+ 3 15.9	-1.3014	0.5013	0.2208	-40	-90
Aquarii	5.9	1.42	5.1	13 58.5	**6** 2 49.6	+ 9 29.3	-0.5791	0.4990	0.2279	+10	-81
B. Aquarii	6.2	1.38	5.2	13 21.9	5 48.9	-11 36.4	-0.5630	0.4979	0.2312	+12	-80
Aquarii	6.1	+1.40	+ 5.7	-15 2.1	5 57.0	-11 28.6	+1.3044	0.4979	+0.2313	+75	+37
Aquarii	6.1	1.23	5.2	11 1.1	15 49.2	- 1 53.1	-0.7734	0.4951	0.2407	+ 1	-90
Aquarii	5.8	1.22	5.8	12 5.0	18 31.1	+ 0 44.2	+1.0457	0.4944	0.2432	+78	+13
Aquarii	4.5	1.09	6.0	9 33.9	**7** 6 45.7	-11 21.6	+1.3256	0.4926	0.2525	+81	+36
Aquarii	5.3	1.06	5.6	8 12.3	7 18.7	-10 49.5	-0.0185	0.4926	0.2529	+42	-45
Piscium	5.6	+0.85	+ 5.2	- 3 15.0	**8** 0 22.3	+ 5 45.8	-0.9959	0.4929	+0.2620	- 8	-90

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

JUNE.

The Star's					At Conjunction in R. A.						Limiting Parallels.	
Name.	Mag.	Red'ns from 1912.0. Δα	Red'ns from 1912.0. Δδ	Apparent Declination.	Washington Mean Time.	Hour Angle, *H*	*Y*	*x′*	*y′*	N.	S.
		s	"	° ′	d h m	h m				°	°
24 Piscium	6.1	+0.83	+ 5.5	- 3 38.6	**8** 3 6.0	+ 8 24.9	+0.1464	0.4932	+0.2631	+52	-37
27 Piscium	5.1	0.79	5.9	4 2.6	6 14.8	+11 28.4	+1.4070	0.4935	0.2644	+86	+47
29 Piscium	5.1	0.77	5.8	3 30.9	7 57.7	-10 51.5	+1.2921	0.4938	0.2649	+87	+32
80 B. Piscium	6.3	0.73	5.1	- 0 59.4	9 43.5	- 9 8.7	-0.9596	0.4943	0.2653	- 6	-90
44 Piscium	6.0	0.62	5.1	+ 1 27.2	20 44.0	+ 1 33.3	-0.6415	0.4973	0.2675	+11	-86
147 B. Piscium	5.9	+0.48	+ 4.3	+ 4 49.8	**9** 8 55.4	-10 36.1	-0.9698	0.5023	+0.2674	- 7	-86
171 B. Piscium	6.3	0.39	4.7	6 0.6	14 57.1	- 4 44.9	-0.6074	0.5055	0.2663	+13	-80
73 Piscium	6.2	0.37	5.1	5 11.2	17 34.6	- 2 12.0	+0.9618	0.5070	0.2658	+90	+ 6
ζ Piscium	5.6	0.34	5.0	7 6.7	22 7.2	+ 2 12.5	+0.1346	0.5099	0.2642	+51	-37
88 Piscium	6.2	0.34	5.2	6 31.9	22 37.7	+ 2 42.1	+0.8804	0.5102	0.2640	+90	+ 2
54 Ceti	6.0	+0.14	+ 5.1	+10 36.6	**10** 16 38.3	- 3 50.5	+1.2776	0.5237	+0.2539	+90	+34
26 B. Arietis	6.0	0.12	5.1	11 52.2	20 45.3	+ 0 8.7	+1.0035	0.5274	0.2504	+90	+12
12 H.¹ Arietis	6.3	0.10	4.9	13 3.2	22 15.1	+ 1 35 7	+0.1486	0.5286	0.2489	+52	-34
19 Arietis	5.8	+0.05	4.7	14 52.1	**11** 3 10.7	+ 6 21.6	-0.5132	0.5333	0.2440	+17	-69
27 Arietis	6.4	-0.05	4.6	17 19.0	11 23.8	- 9 41.6	-1.0610	0.5415	0.2342	-16	-73
36 Arietis	6.5	-0.09	+ 5.0	+17 23.6	17 25.5	- 3 52.3	+0.2528	0.5476	+0.2262	+59	-24
40 Arietis	6.0	0.08	5.1	17 55.1	19 17.2	- 2 4.5	+0.1333	0.5496	0.2235	+52	-30
π Arietis	5.2	0.08	5.3	17 6.0	19 37.9	- 1 44.6	+1.0479	0.5499	0.2231	+90	+20
45 Arietis	6.0	0.10	5.3	17 58.6	22 28.7	+ 1 0.2	+0.7794	0.5530	0.2181	+90	+ 4
ρ Arietis	5.6	0.10	5.3	17 40.5	22 44.6	+ 1 15.5	+1.1463	0.5532	0.2177	+90	+28
δ Arietis	4.5	-0.16	+ 5.5	+19 23.8	**12** 5 15.8	+ 7 32.7	+0.7750	0.5606	+0.2065	+90	+ 5
ζ Arietis	5.0	0.18	5.3	20 43.2	6 38.5	+ 8 52.4	-0.2875	0.5619	0.2042	+29	-49
τ Arietis	5.1	0.20	5.5	20 49.9	9 17.8	+11 25.8	+0.1349	0.5649	0.1988	+52	-27
63 Arietis	5.2	0.20	5.6	20 25.8	9 56.5	-11 57.0	+0.6710	0.5657	0.1973	+90	0
65 Arietis	6.0	0.20	5.6	20 29.6	10 38.4	-11 16.7	+0.7433	0.5665	0.1957	+90	+ 5
66 Arietis	6.1	-0.23	+ 5.3	+22 30.2	12 16.5	- 9 42.2	-0.9729	0.5682	+0.1925	-11	-68
				NEW	*MOON.*						
φ Geminorum	5.0	+0.11	+ 8.3	+26 59.8	**16** 13 47.1	+11 39.7	-0.7490	0.6042	-0.1161	+ 2	-64
ω Cancri	5.9	0.13	8.0	25 38.2	16 32.2	- 9 42.3	+0.2608	0.6023	0.1249	+60	-12
4 Cancri	6.2	+0.14	+ 7.9	+25 20.1	16 50.2	- 9 25.0	+0.5211	0.6020	-0.1257	+79	0
ψ Cancri	5.9	0.17	7.7	25 46.6	20 4.2	- 6 19.3	-0.3394	0.5998	0.1353	+25	-44
λ Cancri	5.9	0.21	7.4	24 18.1	23 51.8	- 2 41.2	+0.5815	0.5963	0.1466	+85	+ 2
28 Cancri	6.1	0.25	7.3	24 26.4	**17** 2 55.0	+ 0 14.4	-0.0165	0.5937	0.1551	+43	-29
ν¹ Cancri	5.7	0.26	7.2	24 22.8	4 1.3	+ 1 18.0	-0.1316	0.5927	0.1582	+37	-36
ι² Cancri	6.4	+0.26	+ 7.2	+24 23.2	4 35.4	+ 1 50.7	-0.2287	0.5922	-0.1599	+32	-41
ξ Cancri	5.2	0.43	6.0	22 24.2	18 49.0	- 8 29.9	-0.8065	0.5784	0.1959	0	-68
79 Cancri	6.1	0.43	5.9	22 21.4	19 12.7	- 8 7.1	-0.8373	0.5780	0.1966	- 2	-68
90 H.¹ Cancri	6.1	0.43	5.7	21 38.9	20 32.1	- 6 50.8	-0.3963	0.5767	0.1993	+23	-54
57 B. Leonis	6.5	0.57	4.1	19 16.2	**18** 9 15.7	+ 5 23.9	-0.7384	0.5638	0.2245	+ 4	-71
107 B. Leonis	6.3	+0.65	+ 2.5	+16 11.2	18 20.5	- 9 51.1	+0.2326	0.5549	-0.2395	+57	-26
η Leonis	3.6	0.67	2.8	17 11.6	19 2.8	- 9 10.3	-0.9443	0.5542	0.2406	- 8	-73
37 Leonis	5.5	0.68	1.5	14 10.1	23 9.8	- 5 12.1	+1.0874	0.5505	0.2457	+90	+20
42 Leonis	6.1	0.72	1.7	15 25.2	**19** 1 26.3	- 3 0.4	-0.7335	0.5484	0.2486	+ 5	-75
46 Leonis	5.8	0.77	+ 1.1	14 35.4	6 4.8	+ 1 28.5	-1.0693	0.5443	0.2543	-16	-76
l Leonis	5.3	+0.83	- 0.7	+11 0.6	13 52.7	+ 9 0.6	+0.5237	0.5379	-0.2618	+76	-15
308 B. Leonis	5.8	0.93	2.6	8 32.5	**20** 1 29.6	- 3 45.5	-0.0709	0.5296	0.2703	+40	-47
σ Leonis	4.1	0.95	3.5	6 30.7	4 54.0	- 0 27.6	+1.0715	0.5273	0.2723	+90	+14
10 Virginis	6.2	1.18	6.8	+ 2 23.4	**21** 4 42.7	- 1 23.6	-1.2791	0.5161	0.2771	-30	-88
13 Virginis	5.9	1.21	8.0	- 0 18.0	9 12.6	+ 2 58.0	+0.2507	0.5148	0.2767	+58	-31
η Virginis	4.0	+1.22	- 8.0	- 0 10.8	9 50.1	+ 3 34.4	-0.0468	0.5146	-0.2765	+42	-47
91 G. Virginis	6.5	1.38	10.2	3 44.9	**22** 2 52.6	- 3 54.0	-1.0231	0.5120	0.2709	-10	-90
h Virginis	5.4	1.58	13.0	9 42.9	22 48.1	- 8 34.6	-0.0518	0.5131	0.2573	+40	-47
86 Virginis	5.6	1.65	13.9	11 59.4	**23** 5 19.7	- 2 14.7	+0.6876	0.5142	0.2515	+79	- 8
621 B. Virginis	6.4	1.76	14.9	14 33.2	14 35.1	+ 6 43.8	+1.1225	0.5166	0.2415	+76	+19
ι *Libræ (var.)*	4.7	+2.17	-15.7	-19 27.8	**24** 23 36.2	- 9 17.2	-0.8730	0.5293	-0.1937	-12	-90

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

JUNE.

The Star's					At Conjunction in R. A.						Limiting Parallels.	
Name.	Mag.	Red'ns from 1912.0.		Apparent Declination.	Washington Mean Time.		Hour Angle, *H*	*Y*	*x'*	*y'*	N.	S.
		Δα	Δδ									
		s	"	° ′	d	h m	h m				°	°
25 Libræ	6.0	+2.17	-15.6	-19 19.3	**25**	0 7.7	- 8 46.7	-1.1288	0.5296	-0.1927	-28	-90
169 B. Libræ	6.0	2.34	15.8	22 51.3		11 36.7	+ 2 19.8	+0.5868	0.5349	0.1714	+64	-12
177 B. Libræ	6.2	2.35	15.8	22 52.0		12 20.2	+ 3 1.9	+0.4766	0.5352	0.1699	+58	-18
42 Libræ	5.0	2.36	15.9	23 32.2		12 45.4	+ 3 26.3	+1.1301	0.5354	0.1692	+67	+24
31 B. Scorpii	5.4	2.45	15.6	24 16.6		19 3.4	+ 9 31.7	+0.9043	0.5383	0.1567	+66	+ 8
32 B. Scorpii	5.3	+2.44	-15.5	-23 43.2		19 4.8	+ 9 33.1	+0.2982	0.5383	-0.1567	+46	-28
40 B. Scorpii	5.4	2.47	15.4	24 34.9		21 12.4	+11 36.5	+0.9049	0.5392	0.1520	+66	+ 8
50 B. Scorpii	6.4	2.50	15.2	24 29.3		23 39.3	-10 1.6	+0.4369	0.5402	0.1468	+53	-20
57 B. Scorpii	5.7	2.50	14.9	23 22.3	**26**	0 40.6	- 9 2.4	-0.9264	0.5406	0.1448	-20	-90
24 G. Scorpii	6.2	2.52	15.0	24 13.9		1 28.1	- 8 16.5	-0.1057	0.5410	0.1430	+23	-50
27 G. Scorpii	5.8	+2.51	-14.8	-23 27.3		1 52.5	- 7 52.9	-1.0076	0.5412	-0.1422	-26	-90
41 G. Scorpii	6.3	2.55	14.7	24 12.1		4 9.2	- 5 40.8	-0.5148	0.5422	0.1370	+ 2	-78
85 B. Scorpii	6.0	2.57	14.9	25 15.5		4 39.1	- 5 11.9	+0.5663	0.5424	0.1360	+59	-13
19 Scorpii	4.9	2.58	14.4	23 57.7		7 16.8	- 2 39.6	-1.1951	0.5434	0.1305	-43	-90
σ Scorpii	3.1	2.60	14.6	25 23.2		7 30.4	- 2 26.5	+0.3264	0.5435	0.1299	+44	-26
α Scorpii	1.2	+2.66	-14.3	-26 14.5		11 12.3	+ 1 7.8	+0.7938	0.5449	-0.1213	+64	+ 1
22 Scorpii	4.8	2.64	14.1	24 55.6		11 35.3	+ 1 30.1	-0.6868	0.5450	0.1204	- 9	-90
116 B. Scorpii	6.2	2.66	14.3	26 21.0		12 5.6	+ 1 59.4	+0.8059	0.5452	0.1190	+64	+ 2
134 B. Scorpii	6.4	2.74	13.7	27 17.7		17 52.0	+ 7 33.8	+1.1888	0.5473	0.1056	+63	+34
118 B. Ophiuchi	6.2	2.82	12.3	26 23.9	**27**	3 55.9	- 6 43.2	-0.7343	0.5501	0.0810	-16	-90
95 G. Ophiuchi	6.1	+2.86	-12.1	-27 39.4		6 21.3	- 4 22.9	+0.4554	0.5508	-0.0751	+47	-18
36 Ophi. (*1st star*)	5.4	2.83	12.3	26 28.7		7 41.6	- 3 5.3	-0.9361	0.5510	0.0718	-29	-90
43 Ophiuchi	5.4	2.91	11.4	28 3.7		11 10.5	+ 0 16.2	+0.5663	0.5515	0.0628	+53	-12
163 G. Ophiuchi	6.3	2.98	10.0	27 50.7		19 56.8	+ 8 44.1	-0.1246	0.5527	0.0407	+12	-51
X Sagittarii (*var.*)	4.4	2.99	9.7	27 48.0		21 49.2	+10 32.5	-0.2448	0.5528	0.0354	+ 6	-59
4 G. Sagittarii	6.2	+2.97	- 9.6	-26 56.8		22 14.0	+10 56.5	-1.1987	0.5528	-0.0345	-52	-90
10 G. Sagittarii	5.7	3.01	9.1	28 3.2	**28**	1 49.5	- 9 35.7	-0.0878	0.5529	0.0251	+13	-49
210 B. Scorpii	5.8	3.04	9.0	28 45.1		2 40.3	- 8 46.7	+0.6610	0.5529	0.0229	+58	- 6
38 B. Sagittarii	4.7	3.05	8.2	28 28.2		6 49.0	- 4 46.8	+0.2771	0.5530	0.0120	+31	-28
C.D.-28° 14268	6.4	3.07	7.9	28 55.4		8 30.9	- 3 8.4	+0.7607	0.5528	0.0076	+62	0
48 G. Sagittarii	6.3	+3.07	- 7.6	-28 19.2		10 54.4	- 0 50.0	+0.0837	0.5525	-0.0014	+19	-39
62 B. Sagittarii	6.0	3.08	7.5	28 41.1		10 54.6	- 0 49.8	+0.4864	0.5525	-0.0014	+43	-16
58 G. Sagittarii	6.1	3.07	7.1	28 28.4		12 56.2	+ 1 7.5	+0.2551	0.5523	+0.0039	+29	-30
φ Sagittarii	3.3	3.08	5.2	27 5.0		23 24.4	+11 13.7	-1.0990	0.5504	0.0308	-44	-90
τ Sagittarii	3.5	3.10	3.6	27 48.1	**29**	8 52.9	- 3 37.5	+0.1000	0.5478	0.0547	+25	-38
183 B. Sagittarii	6.2	+3.13	- 3.4	-28 46.4		9 7.1	- 3 23.8	+1.1907	0.5477	+0.0553	+62	+36
234 B. Sagittarii	5.9	3.10	1.9	28 2.2		16 47.0	+ 4 0.3	+0.8710	0.5449	0.0740	+62	+ 7
248 B. Sagittarii	5.7	3.09	- 1.6	27 10.0		19 14.0	+ 6 22.3	+0.0946	0.5439	0.0798	+27	-39
ω Sagittarii	4.8	3.05	+ 0.7	26 32.0	**30**	7 9.5	- 6 6.2	+0.5107	0.5383	0.1072	+53	-16
A Sagittarii	4.9	+3.03	+ 0.9	-26 26.0		8 37.0	- 4 41.6	+0.5591	0.5374	+0.1106	+56	-13

JULY

Name.	Mag.	Δα	Δδ	Apparent Declination.	d	h m	Hour Angle, *H*	*Y*	*x'*	*y'*	N.	S.
40 B. Capricorni	6.2	+2.94	+ 3.6	-25 14.4	**1**	0 40.7	+10 50.6	+1.2843	0.5286	+0.1440	+65	+46
56 B. Capricorni	6.3	2.91	4.3	24 5.7		4 12.4	- 9 44.4	+0.5311	0.5266	0.1509	+58	-15
χ Capricorni	5.3	+2.74	+ 6.0	-21 32.8		18 13.4	+ 3 50.3	-0.0080	0.5183	+0.1758	+31	-44
27 Capricorni	6.1	2.72	5.9	20 54.5		18 43.3	+ 4 19.3	-0.6285	0.5180	0.1767	0	-88
φ Capricorni	5.3	2.70	6.4	21 0.9		21 46.6	+ 7 17.0	+0.0379	0.5162	0.1817	+34	-42
33 Capricorni	5.3	2.68	7.1	21 13.5	**2**	2 5.4	+11 28.0	+1.0677	0.5137	0.1885	+69	+18
128 B. Capricorni	6.5	2.62	7.2	19 31.8		5 5.0	- 9 37.8	-0.2431	0.5121	0.1930	+22	-58
37 Capricorni	5.7	+2.62	+ 7.8	-20 28.5		7 34.0	- 7 13.3	+1.2896	0.5107	+0.1966	+70	+40
ε Capricorni	4.7	2.60	7.8	19 51.5		8 43.1	- 6 6.2	+0.8329	0.5100	0.1983	+70	+ 2
κ Capricorni	4.8	2.57	8.1	19 15.9		11 36.1	- 3 18.3	+0.7516	0.5085	0.2022	+71	- 4
152 B. Capricorni	6.5	2.49	8.2	17 15.2		15 33.7	+ 0 32.4	-0.6686	0.5064	0.2076	+ 2	-90
29 Aquarii (*mean*)	6.5	2.44	9.0	17 23.2		21 59.2	+ 6 46.6	+0.8384	0.5032	0.2157	+73	
39 Aquarii	6.2	+2.34	+ 9.0	-14 37.5	**3**	3 19.0	+11 57.2	-1.0538	0.5007	+0.2219	-19	

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

JULY.

The Star's					At Conjunction in R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1912.0.		Apparent Declination.	Washington Mean Time.	Hour Angle, H	Y	x′	y′	N.	S.
		Δα	Δδ								
		s	″	° ′	d h m	h m				°	°
45 Aquarii	6.1	+2.30	+ 9.2	−13 44.6	**3** 6 50.7	− 8 37.1	−1.2394	0.4992	+0.2258	−34	−90
50 Aquarii	5.9	2.28	9.7	13 58.4	9 46.2	− 5 46.6	−0.3198	0.4979	0.2289	+23	−62
182 B. Aquarii	6.2	2.25	9.8	13 21.8	12 46.9	− 2 51.0	−0.2999	0.4968	0.2318	+24	−62
70 Aquarii	6.1	2.12	10.3	11 1.1	22 52.6	+ 6 57.9	−0.5005	0.4934	0.2410	+16	−74
74 Aquarii	5.8	2.11	10.9	12 4.9	**4** 1 36.2	+ 9 37.0	+1.3324	0.4926	0.2432	+78	+38
h Aquarii	5.4	+2.00	+10.4	− 8 10.0	8 3.8	− 8 6.1	−1.3915	0.4910	+0.2480	−48	−90
χ Aquarii	5.3	1.94	11.0	8 12.2	14 32.9	− 1 47.6	+0.2732	0.4899	0.2522	+57	−30
317 B. Aquarii	6.3	1.89	10.6	6 23.1	16 41.3	+ 0 17.2	−1.1799	0.4896	0.2535	−23	−90
337 B. Aquarii	6.4	1.84	10.5	5 0.5	21 36.2	+ 5 4.1	−1.4342	0.4891	0.2562	−59	−90
20 Piscium	5.6	1.72	10.9	3 14.9	**5** 7 51.8	− 8 57.0	−0.7034	0.4889	0.2605	+ 8	−90
24 Piscium	6.1	+1.70	+11.2	− 3 38.5	10 38.2	− 6 15.2	+0.4494	0.4890	+0.2614	+70	−21
80 B. Piscium	6.3	1.61	10.8	− 0 59.3	17 22.9	+ 0 18.5	−0.6662	0.4897	0.2632	+10	−88
98 B. Piscium	6.3	1.53	10.6	+ 1 12.2	**6** 0 25.0	+ 7 9.0	−1.1835	0.4910	0.2644	−22	−89
44 Piscium	6.0	1.48	10.8	1 27.3	4 36.4	+11 13.5	−0.3467	0.4920	0.2648	+26	−63
147 B. Piscium	5.9	1.36	9.8	4 49.9	17 3.5	− 0 40.3	−0.6844	0.4963	0.2641	+ 9	−85
171 B. Piscium	6.3	+1.27	+10.3	+ 6 0.7	23 13.5	+ 5 19.2	−0.3226	0.4992	+0.2628	+28	−61
ε Piscium	4.4	1.24	9.9	7 25.2	**7** 0 52.8	+ 6 55.7	−1.3924	0.5000	0.2624	−45	−83
73 Piscium	6.2	1.26	10.8	5 11.3	1 54.7	+ 7 55.9	+1.2624	0.5005	0.2621	+90	+30
ζ Piscium	5.6	1.20	10.3	7 6.8	6 33.7	−11 33.2	+0.4214	0.5031	0.2604	+68	−21
88 Piscium	6.2	1.20	10.6	6 32.0	7 5.0	−11 2.7	+1.1751	0.5035	0.2602	+90	+23
π Piscium	5.6	+1.06	+ 9.4	+11 41.7	18 36.2	+ 0 8.1	−1.3345	0.5111	+0.2544	−38	−78
26 B. Arietis	6.0	0.96	9.8	11 52.3	**8** 5 45.1	+10 56.4	+1.2712	0.5200	0.2460	+90	+35
12 H.[1] Arietis	6.3	0.94	9.4	13 3.3	7 17.1	−11 34.5	+0.4041	0.5213	0.2446	+68	−19
19 Arietis	5.8	0.89	9.0	14 52.2	12 19.9	− 6 41.3	−0.2736	0.5258	0.2397	+30	−53
27 Arietis	6.4	0.80	8.5	17 19.0	20 44.9	+ 1 27.4	−0.8420	0.5339	0.2301	− 1	−73
36 Arietis	6.5	+0.75	+ 8.8	+17 23.7	**9** 2 55.2	+ 7 25.4	+0.4743	0.5404	+0.2219	+73	−12
40 Arietis	6.0	0.73	8.7	17 55.2	4 49.4	+ 9 15.7	+0.3501	0.5424	0.2192	+65	−18
π Arietis	5.2	0.73	9.0	17 6.1	5 10.6	+ 9 36.2	+1.2730	0.5428	0.2186	+90	+41
45 Arietis	6.0	0.70	8.8	17 58.7	8 5.2	−11 35.3	+0.9956	0.5459	0.2142	+90	+18
ρ Arietis	5.6	0.71	8.8	17 40.5	8 21.5	−11 19.5	+1.3656	0.5462	0.2137	+90	+61
47 Arietis	5.8	+0.69	+ 8.1	+20 19.1	9 3.8	−10 38.7	−1.2091	0.5469	+0.2125	−30	−70
δ Arietis	4.5	0.64	8.6	19 23.8	15 1.2	− 4 53.8	+0.9763	0.5536	0.2025	+90	+19
ζ Arietis	5.0	0.62	8.2	20 43.3	16 25.6	− 3 32.5	−0.0994	0.5551	0.2000	+39	−38
τ Arietis	5.1	0.60	8.3	20 50.0	19 8.2	− 0 55.8	+0.3210	0.5582	0.1949	+63	−16
63 Arietis	5.2	0.59	8.4	20 25.8	19 47.7	− 0 17.6	+0.8605	0.5590	0.1936	+90	+13
65 Arietis	6.0	+0.59	+ 8.4	+20 29.7	20 30.4	+ 0 23.5	+0.9322	0.5598	+0.1922	+90	+17
66 Arietis	6.1	0.57	7.9	22 30.2	22 10.5	+ 1 59.9	−0.8034	0.5616	0.1889	0	−67
16 Tauri	5.4	0.51	7.7	24 0.9	**10** 4 57.3	+ 8 31.5	−1.1066	0.5694	0.1746	−23	−66
17 Tauri	3.8	0.51	7.7	23 50.4	4 59.2	+ 8 33.3	−0.9221	0.5695	0.1745	− 8	−66
q Tauri	4.3	0.51	7.6	24 11.6	5 7.1	+ 8 40.9	−1.2597	0.5696	0.1742	−40	−66
20 Tauri	4.1	+0.51	+ 7.6	+24 5.7	5 22.4	+ 8 55.7	−1.1150	0.5699	+0.1736	−23	−66
21 Tauri	5.8	0.51	7.6	24 17.0	5 24.3	+ 8 57.5	−1.2997	0.5699	0.1736	−47	−66
22 Tauri	6.5	0.51	7.6	24 15.4	5 27.7	+ 9 0.8	−1.2628	0.5700	0.1734	−40	−66
23 Tauri	4.3	0.51	7.8	23 40.6	5 35.0	+ 9 7.8	−0.6528	0.5701	0.1732	+ 8	−65
η Tauri	3.0	0.50	7.8	23 50.2	6 3.3	+ 9 35.0	−0.7328	0.5706	0.1721	+ 4	−66
104 B. Tauri	5.5	+0.51	+ 8.0	+23 9.2	6 25.0	+ 9 56.0	+0.0223	0.5711	+0.1712	+45	−26
27 Tauri	3.7	0.50	7.8	23 47.2	6 44.4	+10 14.6	−0.5656	0.5714	0.1705	+13	−60
28 Tauri	5.2	0.50	7.8	23 52.2	6 45.0	+10 15.1	−0.6490	0.5715	0.1705	+ 8	−64
133 B. Tauri	5.9	0.50	8.3	21 58.8	7 4.4	+10 33.8	+1.3267	0.5718	0.1697	+90	+62
33 Tauri	6.0	0.48	8.1	22 55.4	9 57.2	−10 40.1	+0.8466	0.5750	0.1630	+90	+16
161 B. Tauri	6.5	+0.47	+ 8.1	+22 57.3	11 30.7	− 9 10.1	+1.0636	0.5769	+0.1592	+90	+31
36 Tauri	5.6	0.46	8.0	23 52.0	12 51.6	− 7 52.4	+0.3538	0.5783	0.1559	+66	−10
χ Tauri	5.3	0.41	7.8	25 25.5	19 59.7	− 1 1.2	−0.1720	0.5861	0.1373	+34	−35
62 Tauri	6.1	0.40	8.1	24 5.9	20 33.8	− 0 28.5	+1.2400	0.5866	0.1358	+90	+49
17 B. Aurigæ	6.0	0.34	7.5	27 45.2	**11** 7 26.9	+ 9 57.8	−1.1183	0.5975	0.1042	−27	−62
38 B. Aurigæ	6.5	+0.32	+ 7.6	+27 34.6	11 51.0	− 9 49.2	−0.5110	0.6015	+0.0904	+15	−50

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

JULY.

The Star's					At Conjunction in R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1912.0.		Apparent Declination.	Washington Mean Time.	Hour Angle, *H*	*Y*	*x′*	*y′*	N.	S.
		Δα	Δδ								
		s	″	° ′	d h m	h m				°	°
B. Aurigæ	6.0	+0.31	+ 7.6	+27 55.3	**11** 13 43.6	− 8 1.3	−0.6917	0.6030	+0.0844	+ 5	−61
B. Tauri	6.4	0.29	7.7	27 52.3	17 50.1	− 4 5.5	−0.3205	0.6061	0.0709	+26	−37
Aurigæ	6.4	0.29	7.5	28 51.3	18 41.2	− 3 16.5	−1.2402	0.6067	0.0681	−44	−61
Tauri	1.8	0.28	7.6	28 32.2	19 44.8	− 2 15.7	−0.8517	0.6075	+0.0645	− 6	−61
				NEW	*MOON.*						
B. Leonis	6.3	+0.54	+ 2.8	+16 11.2	**16** 3 17.6	+ 0 53.9	+0.0364	0.5637	−0.2453	+46	−36
Leonis	3.6	0.56	2.9	17 11.6	3 58.6	+ 1 33.5	−1.1250	0.5630	0.2463	−20	−73
Leonis	5.5	0.56	2.0	14 10.1	7 58.4	+ 5 24.4	+0.8678	0.5594	0.2522	+90	+ 7
Leonis	6.1	0.59	2.1	15 25.2	10 10.8	+ 7 32.1	−0.9307	0.5573	0.2551	− 6	−75
Leonis	5.8	+0.63	+ 1.6	+14 35.4	14 40.9	+11 52.5	−1.2707	0.5532	−0.2605	−32	−75
Leonis	5.3	0.66	+ 0.1	11 0.7	22 14.6	− 4 49.6	+0.2832	0.5467	0.2682	+60	−27
B. Leonis	5.8	0.74	− 1.5	8 32.5	**17** 9 30.2	+ 6 2.9	−0.3221	0.5380	0.2765	+28	−60
Leonis	4.1	0.75	2.2	6 30.7	12 48.4	+ 9 14.5	+0.7980	0.5357	0.2781	+90	− 2
Virginis	3.8	0.87	4.7	2 15.6	**18** 2 43.8	− 1 17.4	+1.1838	0.5274	0.2820	+90	+22
B. Virginis	6.5	+0.87	− 5.2	+ 1 1.1	6 47.1	+ 2 38.1	+1.2990	0.5254	−0.2822	+90	+33
Virginis	5.9	0.96	6.4	− 0 18.0	16 18.4	+11 51.4	−0.0403	0.5216	0.2812	+42	−46
Virginis	4.0	0.97	6.4	0 10.8	16 54.9	−11 33.2	−0.3341	0.5214	0.2810	+27	−63
G. Virginis	6.5	1.13	8.7	3 44.9	**19** 9 32.3	+ 4 33.2	−1.3054	0.5174	0.2743	−34	−90
Virginis	5.4	1.32	11.7	9 42.9	**20** 5 3.7	− 0 31.5	−0.3421	0.5168	0.2592	+24	−64
Virginis	5.6	+1.40	−12.6	−11 59.4	11 28.8	+ 5 41.8	+0.3945	0.5175	−0.2527	+62	−24
B. Virginis	6.4	1.51	13.8	14 33.2	20 36.2	− 9 27.7	+0.8343	0.5190	0.2422	+75	0
Libræ (*var.*)	4.7	1.97	15.4	19 27.8	**22** 5 20.1	− 1 45.9	−1.1110	0.5293	0.1926	−29	−90
G. Libræ	5.8	2.02	16.1	22 4.7	7 16.2	+ 0 6.4	+1.3281	0.5301	0.1891	+68	+49
B. Libræ	6.0	2.18	16.0	22 51.3	17 18.4	+ 9 48.8	+0.3639	0.5339	0.1700	+50	−24
B. Libræ	6.2	+2.19	−15.9	−22 52.0	18 1.9	+10 31.0	+0.2551	0.5343	−0.1686	+44	−30
Libræ	5.0	2.20	16.1	23 32.2	18 27.0	+10 55.2	+0.9080	0.5345	0.1677	+66	+ 8
B. Scorpii	5.4	2.30	15.9	24 16.6	**23** 0 44.6	− 6 59.7	+0.6939	0.5369	0.1549	+65	− 6
B. Scorpii	5.3	2.30	15.7	23 43.2	0 46.0	− 6 58.3	+0.0888	0.5369	0.1548	+34	−39
B. Scorpii	5.4	2.34	15.8	24 34.9	2 53.6	− 4 54.9	+0.6983	0.5378	0.1503	+65	− 5
B. Scorpii	6.4	+2.38	−15.6	−24 29.3	5 20.5	− 2 33.0	+0.2354	0.5388	−0.1451	+40	−31
B. Scorpii	5.7	2.38	15.2	23 22.3	6 21.9	− 1 33.7	−1.1248	0.5392	0.1429	−36	−90
G. Scorpii	6.2	2.40	15.4	24 13.9	7 9.4	− 0 47.7	−0.3033	0.5395	0.1411	+12	−63
G. Scorpii	5.8	2.40	15.1	23 27.3	7 33.8	− 0 24.2	−1.2036	0.5396	0.1403	−43	−90
G. Scorpii	6.3	2.44	15.2	24 12.1	9 50.7	+ 1 48.1	−0.7074	0.5405	0.1352	− 9	−90
B. Scorpii	6.0	+2.46	−15.4	−25 15.5	10 20.6	+ 2 17.0	+0.3740	0.5407	−0.1342	+47	−23
Scorpii	3.1	2.50	15.2	25 23.2	13 12.1	+ 5 2.7	+0.1394	0.5417	0.1277	+33	−36
Scorpii	1.2	2.57	15.1	26 14.5	16 54.4	+ 8 37.4	+0.6138	0.5430	0.1192	+59	−10
Scorpii	4.8	2.56	14.6	24 55.6	17 17.4	+ 8 59.6	−0.8659	0.5432	0.1183	−20	−90
B. Scorpii	6.2	2.59	15.0	26 21.1	17 47.8	+ 9 29.0	+0.6279	0.5433	0.1171	+60	− 9
B. Scorpii	6.4	+2.69	−14.6	−27 17.7	23 35.0	− 8 55.7	+1.0218	0.5452	−0.1035	+63	+18
B. Ophiuchi	6.2	2.82	13.1	26 23.9	**24** 9 41.0	+ 0 49.3	−0.8824	0.5479	0.0790	−25	−90
G. Ophiuchi	6.1	2.87	13.1	27 39.5	12 7.0	+ 3 10.2	+0.3133	0.5484	0.0729	+37	−26
Ophi. (*1st star.*)	5.4	2.85	13.3	26 28.7	13 27.6	+ 4 28.0	−1.0764	0.5487	0.0695	−40	−90
Ophiuchi	5.4	2.95	12.5	28 3.7	16 57.4	+ 7 50.5	+0.4343	0.5493	0.0607	+43	−20
G. Ophiuchi	6.3	+3.05	−11.1	−27 50.7	**25** 1 46.0	− 7 39.4	−0.2397	0.5504	−0.0382	+ 5	−59
Sagittarii (*var.*)	4.4	3.07	10.8	27 48.1	3 38.9	− 5 50.5	−0.3561	0.5505	0.0334	− 1	−67
G. Sagittarii	5.7	3.13	10.1	28 3.3	7 40.3	− 1 57.5	−0.1906	0.5508	0.0230	+ 6	−56
B. Scorpii	5.8	3.15	10.1	28 45.2	8 31.3	− 1 8.3	+0.5608	0.5508	0.0208	+48	−12
B. Sagittarii	4.7	3.19	9.4	28 28.2	12 41.2	+ 2 52.8	+0.1854	0.5507	0.0100	+25	−33
C. D.−28° 14268	6.4	+3.22	− 9.1	−28 55.4	14 23.6	+ 4 31.7	+0.6730	0.5506	−0.0056	+56	− 5
G. Sagittarii	6.3	3.23	8.7	28 19.2	16 47.8	+ 6 50.8	+0.0002	0.5505	+0.0006	+14	−44
B. Sagittarii	6.0	3.24	8.6	28 41.1	16 48.0	+ 6 51.0	+0.4034	0.5505	0.0006	+37	−21
G. Sagittarii	6.1	3.25	8.2	28 28.4	18 50.1	+ 8 48.8	+0.1763	0.5503	0.0059	+24	−34
Sagittarii	3.3	3.30	6.0	27 5.0	**26** 5 21.2	− 5 2.0	−1.1572	0.5487	0.0329	−49	
Sagittarii	3.5	+3.39	− 4.3	−27 48.1	14 52.0	+ 4 9.0	+0.0639	0.5463	+0.0568	+22	

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

JULY.

The Star's					At Conjunction in R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1912.0. Δα	Red'ns from 1912.0. Δδ	Apparent Declination.	Washington Mean Time.	Hour Angle, *H*	*Y*	*x'*	*y'*	N.	S.
		s	"	° '	d h m	h m				°	°
183 B. Sagittarii	6.2	+3.42	− 4.3	−28 46.5	**26** 15 6.3	+ 4 22.9	+1.1568	0.5463	+0.0574	+61	+32
234 B. Sagittarii	5.9	3.44	2.6	28 2.2	22 47.8	+11 48.5	+0.8535	0.5437	0.0761	+62	+ 6
248 B. Sagittarii	5.7	3.43	− 2.0	27 10.0	**27** 1 15.3	− 9 49.0	+0.0817	0.5428	0.0819	+26	−39
ω Sagittarii	4.8	3.45	+ 0.5	26 32.0	13 13.0	+ 1 44.7	+0.5250	0.5375	0.1095	+53	−15
A Sagittarii	4.9	3.45	0.8	26 26.1	14 40.6	+ 3 9.3	+0.5771	0.5368	0.1127	+57	−12
56 B. Capricorni	6.3	+3.41	+ 5.0	−24 5.7	**28** 10 18.2	− 1 51.1	+0.5937	0.5265	+0.1531	+61	−12
χ Capricorni	5.3	3.30	7.2	21 32.7	**29** 0 19.9	+11 44.3	+0.0865	0.5187	0.1781	+37	−39
27 Capricorni	6.1	3.28	7.3	20 54.5	0 49.8	−11 46.8	−0.5333	0.5184	0.1790	+ 5	−79
φ Capricorni	5.3	3.27	7.9	21 0.9	3 53.2	− 8 49.0	+0.1406	0.5167	0.1840	+40	−36
33 Capricorni	5.3	3.26	8.6	21 13.4	8 12.1	− 4 37.9	+1.1811	0.5142	0.1908	+69	+28
128 B. Capricorni	6.5	+3.21	+ 9.0	−19 31.8	11 11.8	− 1 43.6	−0.1239	0.5127	+0.1954	+28	−51
ε Capricorni	4.7	3.21	9.7	19 51.5	14 50.0	+ 1 48.1	+0.9612	0.5107	0.2006	+70	+10
κ Capricorni	4.8	3.19	10.1	19 15.9	17 43.0	+ 4 36.0	+0.8864	0.5090	0.2046	+71	+ 5
152 B. Capricorni	6.5	3.12	10.5	17 15.2	21 40.7	+ 8 26.8	−0.5262	0.5072	0.2100	+10	−77
29 Aquarii (*mean*)	6.5	3.09	11.6	17 23.1	**30** 4 6.3	− 9 18.8	+0.9966	0.5042	0.2181	+73	+11
39 Aquarii	6.2	+3.01	+12.0	−14 37.5	9 26.3	− 4 7.9	−0.8864	0.5015	+0.2243	− 8	−90
45 Aquarii	6.1	2.97	12.4	13 44.5	12 58.1	− 0 42.2	−1.0649	0.4999	0.2281	−19	−90
50 Aquarii	5.9	2.96	12.8	13 58.3	15 53.7	+ 2 8.4	−0.1379	0.4987	0.2311	+32	−52
182 B. Aquarii	6.2	2.93	13.1	13 21.7	18 54.6	+ 5 4.2	−0.1119	0.4974	0.2342	+34	−50
70 Aquarii	6.1	2.83	14.0	11 1.0	**31** 5 1.2	− 9 6.1	−0.2931	0.4939	0.2431	+26	−60
h Aquarii	5.4	+2.73	+14.6	− 8 9.9	14 13.7	− 0 8.8	−1.1699	0.4912	+0.2498	−23	−90
χ Aquarii	5.3	2.68	15.2	8 12.1	20 44.1	+ 6 11.0	+0.5110	0.4899	0.2538	+72	−18
317 B. Aquarii	6.3	+2.63	+15.0	− 6 23.1	22 53.1	+ 8 16.5	−0.9436	0.4895	+0.2550	− 7	−90

AUGUST.

Name.	Mag.	Δα	Δδ	Apparent Declination.	Washington Mean Time.	Hour Angle, *H*	*Y*	*x'*	*y'*	N.	S.
337 B. Aquarii	6.4	+2.60	+15.1	− 5 0.5	**1** 3 49.3	−10 55.4	−1.1917	0.4888	+0.2574	−24	−90
342 B. Aquarii	6.5	2.58	15.2	4 33.8	4 56.2	− 9 50.3	−1.3916	0.4887	0.2579	−45	−90
20 Piscium	5.6	2.50	15.8	3 14.8	14 8.4	− 0 53.1	−0.4441	0.4879	0.2614	+21	−70
24 Piscium	6.1	2.48	16.1	3 38.4	16 56.1	+ 1 50.2	+0.7180	0.4879	0.2622	+86	− 7
80 B. Piscium	6.3	+2.40	+15.9	− 0 59.2	23 44.0	+ 8 27.0	−0.3958	0.4883	+0.2636	+24	−67
98 B. Piscium	6.3	2.33	15.8	+ 1 12.2	**2** 6 50.0	− 8 38.5	−0.9096	0.4891	0.2644	− 3	−89
44 Piscium	6.0	2.30	16.0	1 27.4	11 4.2	− 4 31.2	−0.0640	0.4899	0.2645	+41	−48
147 B. Piscium	5.9	2.20	15.1	4 50.0	23 40.8	+ 7 44.6	−0.3969	0.4933	0.2632	+24	−66
171 B. Piscium	6.3	2.12	15.7	6 0.8	**3** 5 56.3	−10 10.4	−0.0299	0.4957	0.2615	+43	−45
ε Piscium	4.4	+2.09	+15.3	+ 7 25.2	7 37.2	− 8 32.3	−1.1090	0.4963	+0.2610	−17	−83
ζ Piscium	5.6	2.06	15.7	7 6.9	13 23.7	− 2 55.7	+0.7226	0.4990	0.2587	+90	− 6
π Piscium	5.6	1.94	14.6	11 41.7	**4** 1 40.0	+ 8 59.4	−1.0529	0.5059	0.2520	−13	−78
12 H.[1] Arietis	6.3	1.83	14.5	13 3.4	14 37.6	− 2 26.3	+0.7000	0.5150	0.2415	+90	− 4
19 Arietis	5.8	1.78	13.9	14 52.3	19 47.6	+ 2 34.2	+0.0106	0.5192	0.2365	+45	−38
27 Arietis	6.4	+1.71	+13.1	+17 19.1	**5** 4 25.4	+10 55.5	−0.5726	0.5266	+0.2266	+14	−68
36 Arietis	6.5	1.65	13.2	17 23.7	10 45.5	− 6 56.6	+0.7552	0.5325	0.2181	+90	+ 3
40 Arietis	6.0	1.64	13.0	17 55.3	12 42.8	− 5 3.2	+0.6274	0.5344	0.2153	+87	− 4
45 Arietis	6.0	1.60	13.0	17 58.8	16 4.1	− 1 48.7	+1.2781	0.5378	0.2103	+90	+42
47 Arietis	5.8	1.61	12.2	20 19.2	17 4.2	− 0 50.6	−0.9588	0.5388	0.2086	− 9	−70
δ Arietis	4.5	+1.55	+12.5	+19 23.9	23 11.7	+ 5 4.4	+1.2499	0.5450	+0.1986	+90	+41
ζ Arietis	5.0	1.53	12.0	20 43.3	**6** 0 38.6	+ 6 28.3	+0.1568	0.5466	0.1960	+53	−25
τ Arietis	5.1	1.51	11.9	20 50.0	3 25.8	+ 9 9.7	+0.5795	0.5494	0.1909	+83	− 3
63 Arietis	5.2	1.50	12.1	20 25.9	4 6.5	+ 9 49.0	+1.1258	0.5500	0.1896	+90	+31
65 Arietis	6.0	1.49	12.0	20 29.7	4 50.4	+10 31.3	+1.1974	0.5509	0.1882	+90	+37
66 Arietis	6.1	+1.48	+11.3	+22 30.3	6 33.5	−11 49.2	−0.5657	0.5527	+0.1849	+14	−62
16 Tauri	5.4	1.42	10.7	24 1.0	13 32.3	− 5 5.6	−0.8839	0.5602	0.1706	− 6	−66
17 Tauri	3.8	1.42	10.8	23 50.4	13 34.2	− 5 3.8	−0.6967	0.5602	0.1705	+ 6	−66
ψ Tauri	4.3	1.42	10.7	24 11.7	13 42.3	− 4 55.9	−1.0395	0.5603	0.1702	−17	−66
20 Tauri	4.1	1.42	10.7	24 5.8	13 58.1	− 4 40.7	−0.8930	0.5606	0.1696	− 6	−66
21 Tauri	5.8	+1.42	+10.6	+24 17.0	14 0.0	− 4 38.9	−1.0806	0.5607	+0.1695	−20	−66

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

AUGUST.

The Star's					At Conjunction in R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1912.0. Δα	Red'ns from 1912.0. Δδ	Apparent Declination.	Washington Mean Time.	Hour Angle, H	Y	x'	y'	N.	S.
		s	"	° '	d h m	h m				°	°
Tauri	6.5	+1.42	+10.6	+24 15.4	6 14 3.6	− 4 35.4	−1.0432	0.5607	+0.1694	−17	−66
Tauri	4.3	1.42	10.8	23 40.7	14 11.1	− 4 28.2	−0.4246	0.5608	0.1691	+21	−52
Tauri	3.0	1.41	10.8	23 50.2	14 40.2	− 4 0.1	−0.5064	0.5613	0.1681	+16	−57
B. Tauri	5.5	1.40	11.0	23 9.3	15 2.5	− 3 38.7	+0.2590	0.5617	0.1673	+60	−17
Tauri	3.7	1.40	10.8	23 47.3	15 22.5	− 3 19.5	−0.3381	0.5621	0.1665	+26	−47
Tauri	5.2	+1.40	+10.7	+23 52.3	15 23.1	− 3 18.9	−0.4226	0.5621	+0.1665	+21	−52
Tauri	6.0	1.37	11.0	22 55.4	18 41.0	− 0 8.3	+1.0894	0.5656	0.1591	+90	+32
B. Tauri	6.5	1.36	11.0	22 57.4	20 17.3	+ 1 24.4	+1.3067	0.5673	0.1553	+90	+57
Tauri	5.6	1.34	10.6	23 52.0	21 40.6	+ 2 44.6	+0.5843	0.5689	0.1521	+85	+ 2
Tauri	5.3	1.29	9.9	25 25.5	7 5 1.3	+ 9 48.3	+0.0382	0.5765	0.1337	+47	−24
B. Aurigæ	6.0	+1.20	+ 8.8	+27 45.2	16 48.3	− 2 52.8	−0.9424	0.5880	+0.1009	−12	−62
B. Aurigæ	6.5	1.16	8.7	27 34.6	21 19.8	+ 1 27.6	−0.3355	0.5920	0.0873	+25	−39
B. Aurigæ	6.0	1.14	8.6	27 55.4	23 15.5	+ 3 18.5	−0.5225	0.5936	0.0813	+15	−50
B. Tauri	6.4	1.10	8.4	27 52.3	8 3 28.6	+ 7 21.0	−0.1546	0.5970	0.0680	+35	−28
Aurigæ	6.4	1.10	8.1	28 51.4	4 21.1	+ 8 11.3	−1.0876	0.5977	0.0652	−24	−61
Tauri	1.8	+1.09	+ 8.0	+28 32.2	5 26.3	+ 9 13.8	−0.6963	0.5985	+0.0617	+ 4	−60
B. Aurigæ	6.5	1.06	8.2	27 36.5	9 1.1	−11 20.5	+0.4368	0.6010	0.0499	+73	+ 4
B. Aurigæ	5.7	1.05	8.4	26 52.3	9 28.7	−10 54.1	+1.1976	0.6013	0.0484	+90	+52
B. Aurigæ	5.9	1.06	7.8	29 10.0	10 14.2	−10 10.5	−1.0699	0.6017	0.0459	−23	−61
B. Tauri	5.6	1.01	7.9	27 56.7	14 31.5	− 6 4.2	+0.3222	0.6043	0.0314	+65	0
Tauri	4.6	+1.01	+ 8.0	+27 35.7	15 23.4	− 5 14.6	+0.6983	0.6047	+0.0284	+90	+20
B. Aurigæ	6.4	1.01	7.6	28 55.9	16 32.7	− 4 8.3	−0.6080	0.6054	0.0245	+10	−52
B. Tauri	6.1	0.98	7.8	27 34.2	18 10.8	− 2 34.4	+0.7869	0.6061	0.0188	+90	+26
B. Aurigæ	6.3	0.98	7.2	29 31.3	20 5.5	− 0 44.7	−1.1316	0.6071	0.0122	−30	−60
Aurigæ	4.4	0.96	6.9	29 32.0	23 20.6	+ 2 21.9	−1.1194	0.6083	+0.0008	−28	−60
B. Aurigæ	6.3	+0.94	+ 7.0	+29 35.0	9 1 26.0	+ 4 21.9	−1.1742	0.6089	−0.0065	−35	−60
Aurigæ	5.1	0.90	7.1	28 5.6	6 28.9	+ 9 11.6	+0.2300	0.6103	0.0244	+58	− 4
Aurigæ	5.6	0.90	6.8	29 3.7	7 36.4	+10 16.1	−0.7610	0.6105	0.0284	0	−61
Aurigæ	5.8	0.89	6.9	28 20.6	8 2.2	+10 40.8	−0.0602	0.6105	0.0299	+41	−19
Geminorum	5.5	0.88	6.6	29 3.8	9 53.3	−11 33.0	−0.8343	0.6108	0.0364	− 5	−61
Geminorum	5.6	+0.82	+ 6.5	+27 0.2	19 26.8	− 2 24.6	+0.6924	0.6106	−0.0702	+90	+16
Geminorum	5.9	0.82	6.2	28 3.2	21 4.1	− 0 51.6	−0.4617	0.6103	0.0759	+18	−46
B. Geminorum	6.5	0.81	6.3	26 51.0	21 28.8	− 0 28.0	+0.6931	0.6103	0.0773	+90	+15
Geminorum	5.7	0.80	6.1	27 48.6	10 0 9.7	+ 2 5.8	−0.4732	0.6098	0.0866	+18	−47
Geminorum	3.9	0.79	6.0	27 58.5	0 35.1	+ 2 30.1	−0.6726	0.6097	0.0880	+ 6	−60
Geminorum	5.0	+0.79	+ 5.9	+28 18.1	1 52.6	+ 3 44.2	−1.1105	0.6093	−0.0924	−26	−62
Geminorum	5.0	0.79	5.9	28 6.0	2 3.0	+ 3 54.1	−0.9276	0.6093	0.0930	−11	−62
Geminorum	4.3	0.78	+ 5.9	+27 5.6	4 16.0	+ 6 1.4	−0.1512	0.6087	0.1006	+36	−30
				NEW	*MOON.*						
Virginis	3.8	+0.72	− 3.8	+ 2 15.6	14 12 16.2	+10 3.1	+0.9734	0.5353	−0.2880	+90	+ 7
B. Virginis	6.5	0.71	4.2	+ 1 1.1	16 12.9	−10 8.0	+1.0792	0.5334	0.2882	+90	+14
Virginis	5.9	0.77	5.3	− 0 18.0	15 1 27.7	− 1 11.4	−0.2581	0.5299	0.2872	+31	−58
Virginis	4.0	0.77	5.3	0 10.8	2 3.2	− 0 37.0	−0.5487	0.5297	0.2870	+16	−78
B. Virginis	6.3	0.84	7.7	5 49.3	15 15.0	−11 50.6	+1.4014	0.5262	0.2815	+84	+46
Virginis	5.6	+0.91	− 9.1	− 8 30.9	16 1 20.5	− 2 4.4	+1.3447	0.5249	−0.2746	+81	+38
Virginis	1.2	0.98	10.2	10 42.3	9 21.8	+ 5 41.6	+1.4201	0.5246	0.2675	+79	+54
Virginis	5.4	1.03	10.2	9 42.9	13 7.1	+ 9 19.9	−0.5954	0.5246	0.2637	+12	−82
Virginis	5.6	1.09	11.1	11 59.3	19 21.1	− 8 38.1	+0.1278	0.5250	0.2568	+48	−38
B. Virginis	6.4	1.18	12.3	14 33.1	17 4 13.2	− 0 3.0	+0.5596	0.5260	0.2458	+70	−15
H. Virginis	5.1	+1.22	−12.8	−15 53.4	7 15.9	+ 2 53.8	+1.2131	0.5265	−0.2416	+74	+27
G. Libræ	5.8	1.66	15.2	22 4.7	18 14 4.0	+ 8 41.8	+1.0579	0.5345	0.1903	+68	+17
B. Libræ	6.0	1.83	15.4	22 51.3	23 55.1	− 5 46.9	+0.1099	0.5376	0.1706	+36	−38
B. Libræ	6.2	1.84	15.3	22 52.0	19 0 37.9	− 5 5.5	+0.0027	0.5379	0.1690	+31	−44
Libræ	5.0	1.85	15.5	23 32.2	1 2.6	− 4 41.6	+0.6502	0.5380	0.1683	+65	− 9
Scorpii	4.6	+1.96	−15.8	−25 4.2	7 5.6	+ 1 9.1	+1.3176	0.5399	−0.1553	+65	+54

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

AUGUST.

The Star's					At Conjunction in R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1912.0. Δα	Red'ns from 1912.0. Δδ	Apparent Declination.	Washington Mean Time.	Hour Angle, *H*	*Y*	*x'*	*y'*	N.	S.
		s	"	° '	d h m	h m				°	°
31 B. Scorpii	5.4	+1.96	−15.5	−24 16.6	**19** 7 14.1	+ 1 17.3	+0.4434	0.5399	−0.1550	+53	−20
32 B. Scorpii	5.3	1.95	15.3	23 43.2	7 15.6	+ 1 18.8	−0.1569	0.5399	0.1550	+21	−54
3 Scorpii	5.9	1.97	15.8	24 59.3	7 34.2	+ 1 36.7	+1.1568	0.5400	0.1543	+65	+28
40 B. Scorpii	5.4	1.99	15.5	24 34.9	9 21.2	+ 3 20.1	+0.4498	0.5406	0.1504	+52	−20
48 B. Scorpii	4.9	2.04	15.8	25 37.5	11 29.7	+ 5 24.2	+1.2559	0.5413	0.1456	+64	+40
50 B. Scorpii	6.4	+2.04	−15.4	−24 29.3	11 46.0	+ 5 39.9	−0.0075	0.5414	−0.1450	+27	−45
24 G. Scorpii	6.2	2.06	15.2	24 13.9	13 33.4	+ 7 23.7	−0.5407	0.5418	0.1410	0	−81
41 G. Scorpii	6.3	2.11	15.0	24 12.1	16 12.6	+ 9 57.5	−0.9396	0.5426	0.1350	−23	−90
85 B. Scorpii	6.0	2.13	15.3	25 15.5	16 42.1	+10 25.9	+0.1348	0.5429	0.1339	+34	−37
σ Scorpii	3.1	2.17	15.2	25 23.2	19 31.5	−10 50.5	−0.0953	0.5437	0.1273	+21	−50
α Scorpii	1.2	+2.25	−15.2	−26 14.5	23 11.3	− 7 18.2	+0.3797	0.5446	−0.1187	+45	−23
22 Scorpii	4.8	2.24	14.7	24 55.6	23 34.1	− 6 56.2	−1.0902	0.5447	0.1178	−36	−90
116 B. Scorpii	6.2	2.27	15.1	26 21.1	**20** 0 4.1	− 6 27.2	+0.3948	0.5448	0.1166	+46	−22
134 B. Scorpii	6.4	2.38	15.0	27 17.7	5 47.9	− 0 55.3	+0.7929	0.5463	0.1027	+63	+ 1
118 B. Ophiuchi	6.2	2.53	13.6	26 23.9	15 48.9	+ 8 44.7	−1.0900	0.5482	0.0779	−40	−90
95 G. Ophiuchi	6.1	+2.59	−13.7	−27 39.5	18 14.0	+11 4.7	+0.1033	0.5486	−0.0718	+26	−38
36 Ophi. (*1st star*)	5.4	2.57	13.9	26 28.7	19 34.1	−11 38.0	−1.2789	0.5487	0.0684	−61	−90
43 Ophiuchi	5.4	2.68	13.2	28 3.7	23 2.6	− 8 16.8	+0.2297	0.5492	0.0595	+32	−31
163 G. Ophiuchi	6.3	2.82	12.0	27 50.7	**21** 7 48.9	+ 0 11.0	−0.4304	0.5498	0.0369	− 5	−73
X Sagittarii (*var.*)	4.4	2.85	11.7	27 48.1	9 41.4	+ 1 59.5	−0.5441	0.5498	0.0320	−11	−83
10 G. Sagittarii	5.7	+2.92	−11.1	−28 3.3	13 42.1	+ 5 51.8	−0.3738	0.5498	−0.0216	− 3	−68
210 B. Scorpii	5.8	2.95	11.2	28 45.2	14 33.0	+ 6 40.9	+0.3769	0.5498	0.0194	+36	−23
W Sagittarii (*var.*)	4.4	3.01	11.0	29 35.3	17 20.1	+ 9 22.1	+1.2522	0.5496	0.0121	+60	+49
38 B. Sagittarii	4.7	3.00	10.4	28 28.2	18 42.3	+10 41.4	+0.0081	0.5495	0.0085	+15	−44
C.D.−28° 14268	6.4	3.04	10.3	28 55.4	20 24.5	−11 39.9	+0.4969	0.5493	−0.0041	+43	−16
48 G. Sagittarii	6.3	+3.06	− 9.9	−28 19.2	22 48.5	− 9 21.1	−0.1708	0.5492	+0.0021	+ 5	−55
62 B. Sagittarii	6.0	3.07	9.8	28 41.1	22 48.7	− 9 20.9	+0.2315	0.5492	0.0021	+26	−31
58 G. Sagittarii	6.1	3.09	9.4	28 28.4	**22** 0 50.7	− 7 23.2	+0.0078	0.5489	0.0074	+15	−44
τ Sagittarii	3.5	3.32	5.7	27 48.1	20 52.7	+11 57.1	−0.0742	0.5445	0.0582	+15	−49
183 B. Sagittarii	6.2	3.35	5.7	28 46.5	21 7.0	−11 49.0	+1.0176	0.5444	0.0588	+61	+18
234 •B. Sagittarii	5.9	+3.41	− 4.0	−28 2.3	**23** 4 49.1	− 4 22.8	+0.7272	0.5418	+0.0776	+62	− 2
248 B. Sagittarii	5.7	3.41	3.3	27 10.0	7 16.8	− 2 0.1	−0.0399	0.5410	0.0834	+20	−47
ω Sagittarii	4.8	3.50	0.7	26 32.0	19 15.6	+ 9 34.7	+0.4233	0.5358	0.1109	+47	−21
A Sagittarii	4.9	3.50	− 0.4	26 26.1	20 43.4	+10 59.5	+0.4777	0.5352	0.1141	+51	−18
40 B. Capricorni	6.2	3.56	+ 3.0	25 14.5	**24** 12 50.4	+ 2 35.2	+1.2682	0.5272	0.1478	+65	+42
56 B. Capricorni	6.3	+3.56	+ 4.2	−24 5.7	16 22.5	+ 6 0.6	+0.5295	0.5254	+0.1546	+58	−15
χ Capricorni	5.3	3.51	7.0	21 32.7	**25** 6 24.8	− 4 23.3	+0.0492	0.5180	0.1799	+35	−42
27 Capricorni	6.1	3.50	7.1	20 54.5	6 54.7	3 54.4	−0.5690	0.5178	0.1808	+ 4	−82
φ Capricorni	5.3	3.50	7.7	21 0.9	9 58.1	− 0 56.6	+0.1103	0.5162	0.1858	+39	−38
33 Capricorni	5.3	3.52	8.4	21 13.4	14 16.9	+ 3 14.4	+1.1581	0.5140	0.1927	+69	+25
128 B. Capricorni	6.5	+3.48	+ 9.2	−19 31.8	17 16.4	+ 6 8.5	−0.1398	0.5124	+0.1972	+27	−52
ε Capricorni	4.7	3.49	9.8	19 51.5	20 54.4	+ 9 40.0	+0.9511	0.5106	0.2026	+70	+ 9
κ Capricorni	4.8	3.48	10.4	19 15.9	23 47.2	11 32.3	+0.8822	0.5093	0.2066	+71	+ 4
152 B. Capricorni	6.5	3.42	11.2	17 15.2	**26** 3 44.6	− 7 41.9	−0.5209	0.5073	0.2120	+10	−77
29 Aquarii (*mean*)	6.5	3.43	12.2	17 23.1	10 9.5	− 1 28.2	+1.0129	0.5044	0.2203	+73	+12
39 Aquarii	6.2	+3.36	+13.2	−14 37.4	15 28.7	+ 3 41.8	−0.8569	0.5021	+0.2266	− 6	−90
45 Aquarii	6.1	3.34	13.7	13 44.5	19 0.0	+ 7 7.1	−1.0282	0.5006	0.2304	−16	−90
50 Aquarii	5.9	3.34	14.2	13 58.3	21 55.1	+ 9 57.2	−0.0966	0.4996	0.2335	+34	−49
182 B. Aquarii	6.2	3.32	14.6	13 21.7	**27** 0 55.4	−11 7.5	−0.0646	0.4984	0.2366	+37	−48
70 Aquarii	6.1	3.26	15.9	11 1.0	10 59.9	− 1 19.9	−0.2256	0.4951	0.2456	+30	−57
h Aquarii	5.4	+3.18	+17.0	− 8 9.8	20 10.2	+ 7 35.2	−1.0836	0.4927	+0.2524	−17	−90
χ Aquarii	5.3	3.17	17.7	8 12.1	**28** 2 39.0	−10 6.7	+0.6072	0.4914	0.2564	+78	−13
317 B. Aquarii	6.3	3.12	17.8	6 23.0	4 47.4	− 8 1.8	−0.8416	0.4911	0.2576	− 1	−90
337 B. Aquarii	6.4	3.10	18.1	5 0.4	9 42.3	− 3 14.9	−1.0806	0.4905	0.2601	−15	−90
342 B. Aquarii	6.5	3.09	18.2	4 33.8	10 49.0	− 2 10.0	−1.2784	0.4903	0.2606	−31	−90
20 Piscium	5.6	+3.04	+19.0	− 3 14.7	19 58.9	+ 6 44.9	−0.3160	0.4897	+0.2640	+28	−62

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

AUGUST.

The Star's					At Conjunction in R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1912.0.		Apparent Declination.	Washington Mean Time.	Hour Angle, H	Y	x'	y'	N.	S.
		Δα	Δδ								
		s	"	° '	d h m	h m				°	°
24 Piscium	6.1	+3.04	+19.3	− 3 38.3	**28** 22 45.9	+ 9 27.3	+0.8500	0.4897	+0.2648	+86	0
80 B. Piscium	6.3	2.98	19.5	− 0 59.2	**29** 5 32.3	− 7 57.3	−0.2525	0.4900	0.2662	+31	−58
98 B. Piscium	6.3	2.93	19.8	+ 1 12.3	12 37.0	− 1 4.1	−0.7561	0.4906	0.2668	+ 6	−89
44 Piscium	6.0	2.91	20.0	1 27.5	16 50.4	+ 3 2.4	+0.0957	0.4912	0.2668	+49	−39
147 B. Piscium	5.9	2.86	19.3	4 50.0	**30** 5 25.8	− 8 43.0	−0.2217	0.4943	0.2650	+33	−56
171 B. Piscium	6.3	+2.79	+20.0	+ 6 0.9	11 41.3	− 2 38.0	+0.1528	0.4964	+0.2631	+53	−36
ε Piscium	4.4	2.78	19.8	7 25.3	13 22.2	− 0 59.9	−0.9272	0.4970	0.2625	− 5	−83
ζ Piscium	5.6	2.76	20.1	7 7.0	19 9.2	+ 4 37.2	+0.9147	0.4994	0.2600	+90	+ 5
π Piscium	5.6	2.67	19.3	11 41.8	**31** 7 27.8	− 7 25.5	−0.8579	0.5054	0.2525	− 1	−78
12 H.[1] Arietis	6.3	2.60	19.0	13 3.5	20 30.4	+ 5 13.9	+0.9107	0.5136	0.2415	+90	+ 8
SEPTEMBER.											
19 Arietis	5.8	+2.58	+18.5	+14 52.4	**1** 1 43.2	+10 17.2	+0.2189	0.5172	+0.2361	+57	−28
27 Arietis	6.4	2.53	17.6	17 19.2	10 26.5	− 5 15.9	−0.3671	0.5239	0.2258	+25	−57
36 Arietis	6.5	+2.49	+17.4	+17 23.8	16 51.6	+ 0 57.0	+0.9721	0.5290	+0.2170	+90	+16
40 Arietis	6.0	2.48	17.3	17 55.3	18 50.6	+ 2 52.1	+0.8432	0.5308	0.2142	+90	+ 8
47 Arietis	5.8	2.47	16.3	20 19.3	23 16.0	+ 7 8.7	−0.7580	0.5347	0.2074	+ 3	−68
ε Arietis (*mean*)	4.6	2.45	16.1	20 59.6	23 47.5	+ 7 39.2	−1.3586	0.5352	0.2065	−55	−69
ζ Arietis	5.0	2.40	15.9	20 43.4	**2** 6 58.2	− 9 24.7	+0.3669	0.5416	0.1943	+66	−15
τ Arietis	5.1	+2.39	+15.7	+20 50.1	9 48.6	− 6 40.1	+0.7934	0.5442	+0.1891	+90	+ 9
63 Arietis	5.2	2.38	15.9	20 25.9	10 30.1	− 6 0.0	+1.3456	0.5448	0.1878	+90	+61
66 Arietis	6.1	2.37	15.0	22 30.3	13 0.0	− 3 35.3	−0.3655	0.5471	0.1830	+25	−51
16 Tauri	5.4	2.33	14.1	24 1.0	20 7.7	+ 3 17.3	−0.6909	0.5538	0.1685	+ 6	−66
17 Tauri	3.8	2.33	14.2	23 50.5	20 9.7	+ 3 19.2	−0.5016	0.5538	0.1685	+17	−57
18 Tauri	5.6	+2.33	+13.9	+24 34.1	20 16.5	+ 3 25.8	−1.2410	0.5539	+0.1682	−37	−65
q Tauri	4.3	2.33	14.0	24 11.8	20 18.0	+ 3 27.2	−0.8486	0.5539	0.1682	− 3	−66
20 Tauri	4.1	2.33	14.0	24 5.8	20 34.1	+ 3 42.8	−0.7004	0.5542	0.1676	+ 6	−66
21 Tauri	5.8	2.33	14.0	24 17.1	20 36.0	+ 3 44.6	−0.8903	0.5543	0.1675	− 6	−66
22 Tauri	6.5	2.33	14.0	24 15.5	20 39.7	+ 3 48.2	−0.8525	0.5543	0.1674	− 4	−66
23 Tauri	4.3	+2.32	+14.2	+23 40.7	20 47.4	+ 3 55.6	−0.2265	0.5544	+0.1671	+32	−41
η Tauri	3.0	2.32	14.1	23 50.3	21 17.2	+ 4 24.3	−0.3095	0.5549	0.1661	+27	−46
104 B. Tauri	5.5	2.31	14.3	23 9.3	21 40.0	+ 4 46.3	+0.4652	0.5552	0.1652	+74	− 6
27 Tauri	3.7	2.31	14.1	23 47.3	22 0.4	+ 5 5.9	−0.1394	0.5555	0.1644	+37	−36
28 Tauri	5.2	2.32	14.0	23 52.3	22 1.0	+ 5 6.5	−0.2250	0.5555	0.1644	+32	−41
33 Tauri	6.0	+2.28	+14.1	+22 55.5	**3** 1 23.6	+ 8 21.8	+1.3043	0.5587	+0.1569	+90	+56
36 Tauri	5.6	2.26	13.6	23 52.1	4 27.5	+11 19.0	+0.7914	0.5615	0.1499	+90	+13
p Tauri	5.6	2.26	12.6	26 15.3	7 7.7	−10 6.7	−1.2970	0.5640	0.1434	−50	−64
χ Tauri	5.3	2.22	12.5	25 25.5	11 59.5	− 5 25.9	+0.2333	0.5684	0.1314	+58	−14
17 B. Aurigæ	6.0	2.13	10.6	27 45.2	**4** 0 6.4	+ 6 12.9	−0.7710	0.5788	0.0987	0	−62
38 B. Aurigæ	6.5	+2.08	+10.2	+27 34.6	4 45.9	+10 41.3	−0.1591	0.5824	+0.0852	+35	−30
47 B. Aurigæ	6.0	2.07	10.0	27 55.4	6 45.1	−11 24.3	−0.3505	0.5838	0.0793	+25	−40
354 B. Tauri	6.4	2.02	9.6	27 52.3	11 6.1	− 7 13.8	+0.0189	0.5869	0.0661	+46	−19
22 Aurigæ	6.4	2.03	9.1	28 51.4	12 0.3	− 6 21.7	−0.9295	0.5876	0.0633	−11	−61
β Tauri	1.8	2.02	9.0	28 32.2	13 7.6	− 5 17.2	−0.5332	0.5883	0.0598	+14	−49
107 B. Aurigæ	6.5	+1.96	+ 9.0	+27 36.5	16 49.2	− 1 44.6	+0.6142	0.5905	+0.0482	+90	+13
116 B. Aurigæ	5.9	1.97	8.4	29 10.1	18 4.6	− 0 32.3	−0.9177	0.5913	0.0442	−10	−61
406 B. Tauri	5.6	1.91	8.4	27 56.7	22 30.3	+ 3 42.3	+0.4921	0.5936	0.0299	+78	+ 9
136 Tauri	4.6	1.90	8.4	27 35.7	23 23.9	+ 4 33.7	+0.8733	0.5940	0.0270	+90	+30
154 B. Aurigæ	6.4	1.90	7.8	28 55.9	**5** 0 35.5	+ 5 42.3	−0.4551	0.5946	0.0231	+18	−41
415 B. Tauri	6.1	+1.87	+ 8.1	+27 34.2	2 16.9	+ 7 19.5	+0.9604	0.5954	+0.0176	+90	+36
183 B. Aurigæ	6.3	1.87	7.2	29 31.3	4 15.3	+ 9 12.9	−0.9909	0.5961	+0.0110	−16	−60
κ Aurigæ	4.4	1.83	6.6	29 32.0	7 36.9	−11 33.9	−0.9822	0.5973	−0.0002	−16	−60
211 B. Aurigæ	6.3	1.82	6.6	29 35.0	9 46.5	− 9 29.8	−1.0402	0.5980	0.0074	−20	−60
49 Aurigæ	5.1	1.74	6.5	28 5.6	14 59.5	− 4 30.0	+0.3805	0.5991	0.0251	+69	+ 3
53 Aurigæ	5.6	+1.74	+ 6.0	+29 3.7	16 9.2	− 3 23.2	−0.6278	0.5994	−0.0290	+ 8	−5

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

SEPTEMBER.

The Star's					At Conjunction in R. A.					Limiting Parallels	
Name.	Mag.	Red'ns from 1912.0.		Apparent Declination.	Washington Mean Time.	Hour Angle, H	Y	x'	y'	N.	S.
		Δα	Δδ								
		s	"	° ′	d h m	h m				°	°
54 Aurigæ	5.8	+1.72	+ 6.2	+28 20.6	**5** 16 35.8	− 2 57.8	+0.0838	0.5994	−0.0305	+49	−11
28 Geminorum	5.5	1.72	5.8	29 3.7	18 30.6	− 1 7.9	−0.7049	0.5997	0.0370	+ 4	−60
47 Geminorum	5.6	1.58	5.3	27 0.2	**6** 4 23.1	+ 8 19.5	+0.8335	0.5997	0.0703	+90	+24
53 Geminorum	5.9	1.58	4.8	28 3.2	6 3.6	+ 9 55.8	−0.3404	0.5996	0.0758	+25	−39
134 B. Geminorum	6.5	1.56	5.0	26 51.0	6 29.1	+10 20.3	+0.8314	0.5995	0.0773	+90	+23
59 Geminorum	5.7	+1.54	+ 4.5	+27 48.6	9 15.1	−11 0.8	−0.3563	0.5991	−0.0864	+24	−40
ι Geminorum	3.9	1.54	4.3	27 58.5	9 41.3	−10 35.7	−0.5591	0.5989	0.0879	+13	−53
b^1 Geminorum	5.0	1.53	4.1	28 18.1	11 1.3	− 9 19.1	−1.0052	0.5987	0.0922	−16	−62
b^2 Geminorum	5.0	1.52	4.2	28 6.0	11 12.0	− 9 8.9	−0.8199	0.5987	0.0928	− 3	−62
υ Geminorum	4.3	1.49	4.1	27 5.6	13 29.2	− 6 57.4	−0.0350	0.5981	0.1003	+42	−24
c Geminorum	5.5	+1.44	+ 4.2	+25 59.7	16 33.4	− 4 1.0	+0.7373	0.5973	−0.1102	+90	+15
φ Geminorum	5.0	1.42	3.5	26 59.7	20 3.3	− 0 39.8	−0.6645	0.5961	0.1212	+ 7	−61
ω Cancri	5.9	1.38	3.6	25 38.1	22 52.0	+ 2 1.9	+0.3365	0.5950	0.1300	+65	− 8
4 Cancri	6.2	1.37	3.6	25 20.0	23 10.4	+ 2 19.5	+0.5969	0.5949	0.1309	+87	+ 5
ψ Cancri	5.9	1.34	2.9	25 46.6	**7** 2 27.9	+ 5 28.7	−0.2909	0.5933	0.1409	+28	−41
λ Cancri	5.9	+1.29	+ 3.0	+24 18.1	6 18.8	+ 9 10.1	+0.6095	0.5916	−0.1524	+88	+ 4
28 Cancri	6.1	1.27	2.7	24 26.3	9 24.0	−11 52.3	−0.0111	0.5899	0.1613	+44	−29
υ^1 Cancri	5.7	1.26	2.6	24 22.7	10 30.9	−10 48.1	−0.1340	0.5892	0.1644	+37	−35
υ^2 Cancri	6.4	1.25	2.5	24 23.1	11 5.3	−10 15.1	−0.2349	0.5890	0.1660	+32	−41
ξ Cancri	5.2	1.12	1.4	22 24.1	**8** 1 19.0	+ 3 24.5	−0.9033	0.5800	0.2030	− 6	−68
79 Cancri	6.1	+1.12	+ 1.4	+22 21.3	1 42.6	+ 3 47.2	−0.9358	0.5797	−0.2039	− 8	−68
90 H.^{1} Cancri	6.1	1.10	+ 1.4	+21 38.8	3 1.3	+ 5 2.8	−0.5060	0.5788	0.2070	+17	−60
				NEW	*MOON.*						
g Virginis	5.6	+0.74	− 8.0	− 8 30.9	**12** 11 23.2	+ 9 46.4	+1.2122	0.5313	−0.2792	+81	+24
α Virginis	1.2	+0.77	− 8.9	−10 42.3	19 13.5	− 6 38.6	+1.2766	0.5315	−0.2722	+79	+31
h Virginis	5.4	0.81	9.0	9 42.9	22 53.6	− 3 5.6	−0.7222	0.5318	0.2684	+ 5	−90
86 Virginis	5.6	0.84	9.8	11 59.3	**13** 4 58.3	+ 2 47.1	−0.0124	0.5324	0.2614	+40	−45
621 B. Virginis	6.4	0.90	10.9	14 33.1	13 36.7	+11 8.5	+0.4070	0.5337	0.2501	+61	−23
40 H. Virginis	5.1	0.92	11.3	15 53.4	16 34.5	− 9 59.5	+1.0509	0.5343	0.2460	+74	+14
64 G. Libræ	5.8	+1.27	−13.8	−22 4.7	**14** 22 33.0	− 5 1.4	+0.8839	0.5420	−0.1933	+68	+ 5
169 B. Libræ	6.0	1.41	14.1	22 51.2	**15** 8 8.9	+ 4 14.8	−0.0545	0.5446	0.1730	+28	−48
177 B. Libræ	6.2	1.42	14.1	22 52.0	8 50.5	+ 4 55.0	−0.1606	0.5448	0.1715	+22	−54
42 Libræ	5.0	1.43	14.3	23 32.2	9 14.6	+ 5 18.2	+0.4796	0.5449	0.1706	+56	−18
A Scorpii	4.6	1.52	14.7	25 4.1	15 8.7	+11 0.0	+1.1397	0.5466	0.1573	+65	+26
31 B. Scorpii	5.4	+1.53	−14.4	−24 16.5	15 17.0	+11 8.0	+0.2750	0.5466	−0.1570	+43	−29
32 B. Scorpii	5.3	1.52	14.2	23 43.2	15 18.4	+11 9.4	−0.3187	0.5466	0.1569	+13	−64
3 Scorpii	5.9	1.53	14.6	24 59.2	15 36.6	+11 27.0	+0.9806	0.5467	0.1563	+65	+13
40 B. Scorpii	5.4	1.56	14.5	24 34.9	17 21.1	−10 52.1	+0.2815	0.5471	0.1523	+43	−29
48 B. Scorpii	4.9	1.60	14.8	25 37.5	19 26.5	− 8 51.1	+1.0790	0.5476	0.1473	+64	+21
50 B. Scorpii	6.4	+1.60	−14.4	−24 29.3	19 42.5	− 8 35.8	−0.1708	0.5476	−0.1468	+19	−54
24 G. Scorpii	6.2	1.62	14.2	24 13.9	21 27.3	− 6 54.6	−0.6981	0.5482	0.1427	− 8	−90
65 B. Scorpii	5.5	1.64	14.8	26 5.7	21 32.1	− 6 50.0	+1.2788	0.5481	0.1425	+64	+45
41 G. Scorpii	6.3	1.66	14.1	24 12.1	**16** 0 2.9	− 4 24.5	−1.0928	0.5487	0.1365	−34	−90
85 B. Scorpii	6.0	1.68	14.4	25 15.5	0 31.7	− 3 56.7	−0.0295	0.5488	0.1353	+25	−46
σ Scorpii	3.1	+1.73	−14.4	−25 23.2	3 17.4	− 1 16.9	−0.2569	0.5494	−0.1286	+13	−60
α Scorpii	1.2	1.80	14.5	26 14.5	6 52.4	+ 2 10.6	+0.2139	0.5501	0.1198	+36	−32
22 Scorpii	4.8	1.79	14.0	24 55.6	7 14.7	+ 2 32.1	−1.2414	0.5502	0.1189	−50	−90
116 B. Scorpii	6.2	1.81	14.5	26 21.0	7 44.1	+ 3 0.5	+0.2290	0.5503	0.1176	+37	−32
134 B. Scorpii	6.4	1.92	14.4	27 17.7	13 20.8	+ 8 25.2	+0.6247	0.5512	0.1035	+58	− 9
118 B. Ophiuchi	6.2	+2.09	−13.4	−26 23.9	23 10.7	− 6 5.9	−1.2387	0.5524	−0.0782	−54	−90
95 G. Ophiuchi	6.1	2.14	13.6	27 39.5	**17** 1 33.3	− 4 48.3	−0.0549	0.5526	0.0720	+18	−48
43 Ophiuchi	5.4	2.23	13.3	28 3.7	6 17.2	+ 0 45.3	+0.0721	0.5527	0.0596	+23	−40
163 G. Ophiuchi	6.3	2.37	12.2	27 50.7	14 55.8	+ 9 5.5	−0.5797	0.5526	0.0366	−12	−86
X Sagittarii (*var.*)	4.4	2.41	12.0	27 48.1	16 46.8	+10 52.5	−0.6918	0.5525	0.0317	−19	−90
10 G. Sagittarii	5.7	+2.48	−11.6	−28 3.3	20 44.5	− 9 18.3	−0.5211	0.5521	−0.0212	−11	−81

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

SEPTEMBER.

The Star's Name.	Mag.	Red'ns from 1912.0. Δα	Red'ns from 1912.0. Δδ	Apparent Declination.	At Conjunction in R. A. Washington Mean Time.	Hour Angle, H	Y	x'	y'	Limiting Parallels. N.	Limiting Parallels. S.
		s	"	° '	d h m	h m				°	°
210 B. Scorpii	5.8	+2.51	−11.7	−28 45.2	**17** 21 34.8	− 8 29.8	+0.2249	0.5520	−0.0190	+28	−32
W Sagittarii (*var.*)	4.3	2.57	11.6	29 35.3	**18** 0 20.0	− 5 50.3	+1.0961	0.5516	0.0116	+60	+26
38 B. Sagittarii	4.7	2.57	11.1	28 28.2	1 41.2	− 4 32.1	−0.1394	0.5514	0.0081	+ 7	−53
C.D.−28° 14268	6.4	2.61	11.0	28 55.4	3 22.4	− 2 54.4	+0.3472	0.5511	−0.0036	+33	−25
48 G. Sagittarii	6.3	2.64	10.6	28 19.2	5 44.9	− 0 37.1	−0.3153	0.5507	+0.0026	− 2	−64
62 B. Sagittarii	6.0	+2.64	−10.6	−28 41.1	5 45.1	− 0 36.9	+0.0846	0.5507	+0.0027	+19	−40
58 G. Sagittarii	6.1	2.67	10.2	28 28.4	7 46.0	+ 1 19.8	−0.1368	0.5503	0.0080	+ 8	−53
τ Sagittarii	3.5	2.96	7.0	27 48.1	**19** 3 39.4	− 3 28.6	−0.2070	0.5444	0.0589	+ 9	−57
183 B. Sagittarii	6.2	2.99	7.1	28 46.5	3 53.6	− 3 14.9	+0.8805	0.5443	0.0595	+61	+ 8
234 B. Sagittarii	5.9	3.08	5.4	28 2.3	11 33.7	+ 4 9.4	+0.5967	0.5413	0.0782	+55	−11
248 B. Sagittarii	5.7	+3.09	− 4.8	−27 10.0	14 0.9	+ 6 31.6	−0.1662	0.5402	+0.0841	+13	−54
ω Sagittarii	4.8	3.23	2.3	26 32.1	**20** 1 58.1	− 5 55.2	+0.3043	0.5347	0.1115	+41	−27
A Sagittarii	4.9	3.23	− 2.0	26 26.1	3 25.8	− 4 30.3	+0.3598	0.5339	0.1148	+44	−24
40 B. Capricorni	6.2	3.36	+ 1.3	25 14.5	19 32.3	+11 4.7	+1.1618	0.5257	0.1484	+65	+28
56 B. Capricorni	6.3	3.38	2.7	24 5.7	23 4.6	− 9 29.7	+0.4278	0.5238	0.1552	+52	−21
χ Capricorni	5.3	+3.39	+ 5.6	−21 32.8	**21** 13 7.3	+ 4 6.7	−0.0388	0.5164	+0.1804	+30	−47
27 Capricorni	6.1	3.38	5.8	20 54.5	13 37.2	+ 4 35.6	−0.6554	0.5162	0.1812	− 1	−90
φ Capricorni	5.3	3.40	6.4	21 0.9	16 40.8	+ 7 33.6	+0.0255	0.5146	0.1863	+34	−43
33 Capricorni	5.3	3.43	7.0	21 13.5	20 59.8	+11 44.8	+1.0756	0.5125	0.1932	+69	+18
128 B. Capricorni	6.5	3.40	8.0	19 31.8	23 59.4	− 9 21.0	−0.2169	0.5110	0.1978	+24	−57
37 Capricorni	5.7	+3.44	+ 8.3	−20 28.5	**22** 2 28.4	− 6 56.4	+1.3257	0.5098	+0.2015	+70	+44
ε Capricorni	4.7	3.43	8.6	19 51.5	3 37.5	− 5 49.3	+0.8757	0.5093	0.2032	+70	+ 4
κ Capricorni	4.8	3.44	9.2	19 15.9	6 30.3	− 3 1.6	+0.8098	0.5080	0.2072	+71	0
152 B. Capricorni	6.5	3.40	10.3	17 15.2	10 27.8	+ 0 48.9	−0.5865	0.5062	0.2127	+ 7	−83
29 Aquarii (*mean*)	6.5	3.43	11.3	17 23.1	16 52.5	+ 7 2.4	+0.9509	0.5035	0.2210	+73	+ 8
39 Aquarii	6.2	+3.38	+12.6	−14 37.4	22 11.5	−11 47.8	−0.9093	0.5015	+0.2274	− 9	−90
45 Aquarii	6.1	3.38	13.4	13 44.5	**23** 1 42.5	− 8 22.8	−1.0761	0.5001	0.2313	−19	−90
50 Aquarii	5.9	3.40	13.8	13 58.3	4 37.3	− 5 33.0	−0.1435	0.4992	0.2344	+32	−52
182 B. Aquarii	6.2	3.40	14.3	13 21.7	7 37.2	− 2 38.2	−0.1082	0.4982	0.2376	+34	−50
70 Aquarii	6.1	3.37	16.0	11 1.0	17 40.1	+ 7 7.8	−0.2575	0.4954	0.2468	+28	−59
h Aquarii	5.4	+3.34	+17.6	− 8 9.8	**24** 2 48.2	− 7 59.3	−1.1026	0.4935	+0.2540	−18	−90
χ Aquarii	5.3	3.35	18.3	8 12.1	9 15.1	− 1 43.1	+0.5901	0.4925	0.2581	+77	−14
317 B. Aquarii	6.3	3.31	18.7	6 23.0	11 22.8	+ 0 21.1	−0.8516	0.4922	0.2594	− 1	−90
337 B. Aquarii	6.4	3.32	19.2	5 0.4	16 15.9	+ 5 6.2	−1.0842	0.4918	0.2619	−15	−90
342 B. Aquarii	6.5	3.31	19.4	4 33.8	17 22.1	+ 6 10.6	−1.2800	0.4918	0.2625	−31	−90
20 Piscium	5.6	+3.30	+20.4	− 3 14.7	**25** 2 28.1	− 8 58.4	−0.3111	0.4916	+0.2662	+28	−62
24 Piscium	6.1	3.30	20.6	3 38.3	5 13.7	− 6 17.3	+0.8533	0.4918	0.2669	+86	0
80 B. Piscium	6.3	3.28	21.3	− 0 59.1	11 56.6	+ 0 14.6	−0.2378	0.4923	0.2684	+32	−57
98 B. Piscium	6.3	3.26	21.8	+ 1 12.3	18 57.4	+ 7 3.8	−0.7321	0.4934	0.2693	+ 7	−89
44 Piscium	6.0	3.25	22.1	1 27.5	23 8.3	+11 7.8	+0.1203	0.4942	0.2694	+51	−38
147 B. Piscium	5.9	+3.26	+21.9	+ 4 50.1	**26** 11 35.7	− 0 45.7	−0.1842	0.4975	+0.2677	+35	−54
171 B. Piscium	6.3	3.22	22.8	6 0.9	17 47.0	+ 5 15.1	+0.1940	0.4998	0.2659	+55	−34
ε Piscium	4.4	3.21	22.8	7 25.4	19 26.8	+ 6 52.1	−0.8802	0.5005	0.2653	− 2	−83
ζ Piscium	5.6	3.22	23.0	7 7.0	**27** 1 10.0	−11 34.5	+0.9590	0.5029	0.2626	+90	+ 8
π Piscium	5.6	3.19	22.7	11 41.9	13 20.4	+ 0 14.6	−0.7983	0.5091	0.2552	+ 3	−78
12 H.[1] Arietis	6.3	+3.18	+22.4	+13 3.5	**28** 2 14.8	−11 14.3	+0.9726	0.5170	+0.2439	+90	+12
19 Arietis	5.8	3.18	22.0	14 52.4	7 24.6	− 6 14.1	+0.2856	0.5206	0.2383	+61	−25
27 Arietis	6.4	3.18	21.2	17 19.3	16 3.5	+ 2 8.4	−0.2955	0.5269	0.2276	+29	−53
36 Arietis	6.5	3.17	20.9	17 23.9	22 25.7	+ 8 18.3	+1.0444	0.5319	0.2186	+90	+21
40 Arietis	6.0	3.16	20.7	17 55.4	**29** 0 24.0	+10 12.8	+0.9167	0.5334	0.2157	+90	+13
47 Arietis	5.8	+3.18	+19.9	+20 19.3	4 47.9	− 9 32.0	−0.6825	0.5370	+0.2086	+ 8	−69
ε Arietis (*mean*)	4.6	3.18	19.7	20 59.7	5 19.2	− 9 1.7	−1.2827	0.5374	0.2078	−38	−69
ζ Arietis	5.0	3.15	19.2	20 43.5	12 28.2	− 2 7.3	+0.4444	0.5434	0.1953	+72	−11
τ Arietis	5.1	3.14	19.0	20 50.1	15 18.1	+ 0 36.8	+0.8547	0.5458	0.1900	+90	+12
66 Arietis	6.1	3.15	18.2	22 30.4	18 29.0	+ 3 41.1	−0.2875	0.5485	0.1838	+29	−46
16 Tauri	5.4	+3.14	+17.2	+24 1.1	**30** 1 36.5	+10 33.5	−0.6131	0.5544	+0.1690	+12	−

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

SEPTEMBER.

THE STAR'S					AT CONJUNCTION IN R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1912.0.		Apparent Declination.	Washington Mean Time.	Hour Angle, H	Y	x'	y'	N.	S.
		Δα	Δδ								
		s	″	° ′	d h m	h m				°	°
17 Tauri	3.8	+3.14	+17.2	+23 50.5	30 1 38.6	+10 35.5	−0.4233	0.5545	+0.1689	+21	−52
18 Tauri	5.6	3.15	17.0	24 34.1	1 45.3	+10 41.9	−1.1645	0.5546	0.1687	−28	−65
q Tauri	4.3	3.14	17.1	24 11.8	1 46.8	+10 43.4	−0.7711	0.5546	0.1686	+ 2	−66
20 Tauri	4.1	3.14	17.1	24 5.9	2 3.0	+10 59.0	−0.6227	0.5548	0.1680	+10	−63
21 Tauri	5.8	3.14	17.0	24 17.1	2 4.9	+11 0.8	−0.8129	0.5548	0.1679	− 1	−66
22 Tauri	6.5	+3.14	+17.1	+24 15.5	2 8.6	+11 4.4	−0.7751	0.5549	+0.1678	+ 1	−66
23 Tauri	4.3	3.13	17.2	23 40.8	2 16.3	+11 11.8	−0.1474	0.5550	0.1675	+36	−37
η Tauri	3.0	3.13	17.1	23 50.3	2 46.1	+11 40.6	−0.2307	0.5555	0.1664	+32	−41
104 B. Tauri	5.5	3.12	17.2	23 9.4	3 8.9	−11 57.5	+0.5461	0.5557	0.1656	+81	− 2
27 Tauri	3.7	3.13	17.0	23 47.4	3 29.4	−11 37.7	−0.0601	0.5560	0.1648	+41	−31
28 Tauri	5.2	+3.13	+17.0	+23 52.4	3 30.0	−11 37.1	−0.1459	0.5561	+0.1647	+36	−37
36 Tauri	5.6	3.10	16.3	23 52.1	9 57.3	− 5 23.9	+0.8744	0.5613	0.1500	+90	+18
p Tauri	5.6	3.12	15.3	26 15.4	12 38.1	− 2 49.0	−1.2219	0.5635	0.1434	−36	−64
χ Tauri	5.3	+3.09	+14.9	+25 25.6	17 31.4	+ 1 53.3	+0.3147	0.5673	+0.1312	+64	−10
OCTOBER.											
17 B. Aurigæ	6.0	+3.05	+12.4	+27 45.3	1 5 44.2	−10 22.0	−0.6965	0.5762	+0.0982	+ 5	−62
38 B. Aurigæ	6.5	3.01	11.8	27 34.6	10 26.9	− 5 50.4	−0.0811	0.5792	0.0847	+40	−26
47 B. Aurigæ	6.0	3.00	11.4	27 55.4	12 27.6	− 3 54.5	−0.2744	0.5805	0.0788	+29	−35
354 B. Tauri	6.4	+2.96	+10.7	+27 52.3	16 52.2	+ 0 19.7	+0.0974	0.5829	+0.0656	+50	−15
22 Aurigæ	6.4	2.97	10.2	28 51.4	17 47.1	+ 1 12.3	−0.8591	0.5834	0.0628	− 6	−61
β Tauri	1.8	2.96	10.0	28 32.2	18 55.4	+ 2 17.9	−0.4597	0.5839	0.0593	+18	−44
107 B. Aurigæ	6.5	2.90	9.8	27 36.5	22 40.6	+ 5 54.0	+0.6974	0.5857	0.0477	+90	+18
116 B. Aurigæ	5.9	2.92	9.1	29 10.1	23 57.2	+ 7 7.5	−0.8489	0.5863	0.0437	− 6	−61
406 B. Tauri	5.6	+2.85	+ 8.8	+27 56.7	2 4 27.7	+11 27.1	+0.5736	0.5881	+0.0295	+86	+13
136 Tauri	4.6	2.84	8.7	27 35.7	5 22.3	−11 40.4	+0.9585	0.5884	0.0266	+90	+36
154 B. Aurigæ	6.4	2.85	8.1	28 55.9	6 35.3	−10 30.4	−0.3837	0.5888	0.0227	+23	−37
415 B. Tauri	6.1	2.80	8.3	27 34.3	8 18.7	− 8 51.2	+1.0463	0.5892	0.0172	+90	+42
183 B. Aurigæ	6.3	2.83	7.2	29 31.3	10 19.5	− 6 55.4	−0.9264	0.5899	+0.0107	−11	−60
κ Aurigæ	4.4	+2.79	+ 6.4	+29 32.0	13 45.5	− 3 37.8	−0.9188	0.5906	−0.0004	−11	60
211 B. Aurigæ	6.3	2.77	6.2	29 35.0	15 57.9	− 1 30.9	−0.9781	0.5910	0.0076	−15	−60
49 Aurigæ	5.1	2.67	5.8	28 5.6	21 18.3	+ 3 36.3	+0.4578	0.5916	0.0250	+75	+ 7
53 Aurigæ	5.6	2.68	5.2	29 3.7	22 29.8	+ 4 44.9	−0.5631	0.5917	0.0289	+12	−49
54 Aurigæ	5.8	2.65	5.4	28 20.6	22 57.1	+ 5 11.1	+0.1570	0.5918	0.0304	+54	− 8
28 Geminorum	5.5	+2.65	+ 4.8	+29 3.7	3 0 54.8	+ 7 3.8	−0.6421	0.5918	−0.0368	+ 8	−55
47 Geminorum	5.6	2.48	3.8	27 0.2	11 3.3	− 7 12.8	+0.9137	0.5908	0.0696	+90	+29
53 Geminorum	5.9	2.48	3.1	28 3.1	12 46.6	− 5 33.7	−0.2770	0.5905	0.0751	+29	−35
134 B. Geminorum	6.5	2.45	3.4	26 51.0	13 12.8	− 5 8.5	+0.9110	0.5904	0.0764	+90	+28
59 Geminorum	5.7	2.43	2.7	27 48.6	16 3.7	− 2 24.7	−0.2941	0.5898	0.0854	+28	−37
ι Geminorum	3.9	+2.42	+ 2.4	+27 58.5	16 30.7	− 1 58.8	−0.5001	0.5896	−0.0869	+16	−49
b^1 Geminorum	5.0	2.41	2.1	28 18.1	17 53.1	− 0 39.8	−0.9531	0.5892	0.0912	−13	−62
b^2 Geminorum	5.0	2.41	2.2	28 5.9	18 4.1	− 0 29.2	−0.7652	0.5892	0.0918	0	−62
υ Geminorum	4.3	2.36	2.1	27 5.6	20 25.6	+ 1 46.6	+0.0302	0.5886	0.0991	+46	−21
c Geminorum	5.5	2.29	2.0	25 59.7	23 35.4	+ 4 48.6	+0.8134	0.5875	0.1087	+90	+19
φ Geminorum	5.0	+2.26	+ 1.0	+26 59.7	4 3 12.0	+ 8 16.4	−0.6112	0.5860	−0.1196	+10	−58
ω Cancri	5.9	2.20	1.1	25 38.1	6 6.1	+11 3.6	+0.4037	0.5848	0.1282	+70	− 5
4 Cancri	6.2	2.19	1.1	25 20.0	6 25.0	+11 21.7	+0.6681	0.5846	0.1291	+90	+ 9
ψ Cancri	5.9	2.15	0.2	25 46.5	9 49.0	− 9 22.6	−0.2345	0.5831	0.1390	+31	−38
λ Cancri	5.9	2.07	+ 0.3	24 18.0	13 47.5	− 5 33.4	+0.6781	0.5811	0.1501	+90	+ 7
28 Cancri	6.1	+2.04	− 0.3	+24 26.2	16 59.0	− 2 29.5	+0.0465	0.5794	−0.1589	+47	−26
v^1 Cancri	5.7	2.02	0.4	24 22.7	18 8.1	− 1 23.1	−0.0788	0.5788	0.1619	+40	−32
v^2 Cancri	6.4	2.01	0.5	24 23.1	18 43.7	− 0 48.9	−0.1815	0.5784	0.1635	+34	−38
ξ Cancri	5.2	1.80	2.0	22 24.1	5 9 26.4	−10 40.3	−0.8672	0.5696	0.1999	− 4	−68
79 Cancri	6.1	1.79	2.0	22 21.2	9 50.8	−10 16.9	−0.9005	0.5693	0.2008	− 6	−68
H.[1] Cancri	6.1	+1.76	− 2.0	+21 38.7	11 12.2	− 8 58.6	−0.4645	0.5685	−0.2038	+19	−57

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

OCTOBER.

THE STAR'S					AT CONJUNCTION IN R. A.					LIMITING PARALLELS.	
Name.	Mag.	Red'ns from 1912.0.		Apparent Declination.	Washington Mean Time.	Hour Angle, *H*	*Y*	*x'*	*y'*	N.	S.
		Δα	Δδ								
		s	"	° '	d h m	h m				°	°
B. Leonis	6.5	+1.58	- 3.0	+19 16.1	**6** 0 9.1	+ 3 29.5	-0.8975	0.5602	-0.2304	- 5	-71
B. Leonis	6.3	1.44	3.2	16 11.1	9 16.6	-11 42.8	+0.0100	0.5546	0.2462	+45	-37
Leonis	3.6	1.45	3.6	17 11.5	9 58.8	-11 2.2	-1.1693	0.5542	0.2473	-23	-73
Leonis	5.5	1.36	3.3	14 10.0	14 5.0	- 7 4.7	+0.8265	0.5517	0.2535	+90	+ 4
Leonis	6.1	1.36	3.9	15 25.1	16 20.6	- 4 53.8	-1.0011	0.5504	0.2567	-10	-75
Leonis	5.8	+1.31	- 4.1	+14 35.3	20 56.0	- 0 28.1	-1.3642	0.5479	-0.2628	-44	-75
Leonis	5.3	1.21	4.2	11 0.6	**7** 4 35.7	+ 6 55.7	+0.1625	0.5439	0.2716	+53	-33
Leonis	4.7	1.10	4.3	7 48.7	11 46.7	-10 8.0	+1.3832	0.5408	0.2784	+90	+45
B. Leonis	5.8	1.10	4.9	8 32.5	15 53.3	- 6 9.7	-0.4972	0.5391	0.2815	+19	-71
Leonis	4.1	1.06	4.8	+ 6 30.6	19 10.5	- 2 59.0	+0.6045	0.5379	0.2837	+82	-13
				NEW	*MOON.*						
G. Libræ	6.1	+0.99	-12.2	-21 41.6	**12** 3 47.6	+ 2 10.4	+1.3324	0.5467	-0.2045	+68	+48
G. Libræ	5.8	1.02	12.3	22 4.7	8 12.2	+ 6 25.8	+0.8537	0.5481	0.1956	+68	+ 3
B. Libræ	6.0	1.12	12.7	22 51.2	17 37.1	- 8 29.0	-0.0787	0.5512	0.1752	+27	-49
B. Libræ	6.2	+1.13	-12.7	-22 52.0	18 18.0	- 7 49.6	-0.1841	0.5514	-0.1736	+21	-55
Libræ	5.0	1.14	12.8	23 32.2	18 41.6	- 7 26.8	+0.4513	0.5516	0.1728	+54	-20
Scorpii	4.6	1.20	13.2	25 4.1	**13** 0 28.6	- 1 52.0	+1.1060	0.5534	0.1593	+65	+23
B. Scorpii	5.4	1.20	13.0	24 16.5	0 36.7	- 1 44.3	+0.2481	0.5534	0.1590	+42	-31
B. Scorpii	5.3	1.20	12.9	23 43.2	0 38.1	- 1 42.9	-0.3409	0.5534	0.1590	+12	-65
Scorpii	5.9	+1.21	-13.2	-24 59.2	0 55.9	- 1 25.7	+0.9481	0.5535	-0.1582	+65	+10
B. Scorpii	5.4	1.23	13.0	24 34.9	2 38.3	+ 0 13.0	+0.2545	0.5539	0.1542	+41	-30
B. Scorpii	4.9	1.26	13.3	25 37.5	4 41.1	+ 2 11.5	+1.0456	0.5544	0.1492	+64	+18
B. Scorpii	6.4	1.26	13.0	24 29.3	4 56.8	+ 2 26.6	-0.1941	0.5545	0.1486	+18	-56
G. Scorpii	6.2	1.28	12.9	24 13.8	6 39.5	+ 4 5.6	-0.7171	0.5549	0.1444	- 9	-90
B. Scorpii	5.5	+1.29	-13.3	-26 5.7	6 44.2	+ 4 10.1	+1.2436	0.5549	-0.1442	+64	+39
G. Scorpii	6.3	1.32	12.8	24 12.1	9 11.8	+ 6 32.4	-1.1085	0.5556	0.1381	-35	-90
B. Scorpii	6.0	1.32	13.1	25 15.5	9 40.1	+ 6 59.7	-0.0540	0.5557	0.1370	+24	-48
Scorpii	3.1	1.36	13.1	25 23.2	12 22.4	+ 9 36.1	-0.2795	0.5562	0.1302	+12	-61
Scorpii	1.2	1.42	13.2	26 14.5	15 52.9	-11 0.9	+0.1877	0.5569	0.1213	+35	-34
Scorpii	4.8	+1.42	-12.8	-24 55.5	16 14.8	-10 39.8	-1.2555	0.5570	-0.1202	-52	-90
B. Scorpii	6.2	1.43	13.2	26 21.0	16 43.6	-10 12.1	+0.2026	0.5571	0.1191	+35	-33
B. Scorpii	6.4	1.52	13.2	27 17.7	22 13.4	- 4 54.2	+0.5955	0.5579	0.1047	+57	-11
B. Ophiuchi	6.2	1.65	12.5	26 23.9	**14** 7 51.4	+ 4 22.7	-1.2518	0.5588	0.0790	-56	-90
G. Ophiuchi	6.1	1.70	12.7	27 39.5	10 11.2	+ 6 37.5	-0.0775	0.5588	0.0727	+16	-49
Ophiuchi	5.4	+1.78	-12.5	-28 3.7	14 49.7	+11 5.8	+0.0490	0.5588	-0.0601	+22	-42
G. Ophiuchi	6.3	1.91	11.7	27 50.7	23 18.8	- 4 43.7	-0.5968	0.5581	0.0369	-13	-88
Sagittarii (*var.*)	4.4	1.94	11.5	27 48.1	**15** 1 7.9	- 2 58.6	-0.7079	0.5578	0.0319	-20	-90
G. Sagittarii	5.7	2.01	11.2	28 3.3	5 1.5	+ 0 46.5	-0.5380	0.5572	0.0212	-12	-82
B. Scorpii	5.8	2.03	11.4	28 45.2	5 50.9	+ 1 34.2	+0.2025	0.5570	0.0190	+26	-33
Sagittarii (*var.*)	4.3	+2.09	-11.4	-29 35.3	8 33.4	+ 4 10.8	+1.0678	0.5564	-0.0116	+60	+23
B. Sagittarii	4.7	2.09	10.9	28 28.2	9 53.4	+ 5 27.9	-0.1586	0.5562	0.0080	+ 6	-54
C.D.-28° 14268	6.4	2.12	10.8	28 55.4	11 33.0	+ 7 3.9	+0.3249	0.5557	-0.0035	+32	-26
G. Sagittarii	6.3	2.16	10.5	28 19.2	13 53.3	+ 9 19.1	-0.3327	0.5551	+0.0028	- 3	-66
B. Sagittarii	6.0	2.16	10.4	28 41.1	13 53.5	+ 9 19.3	+0.0644	0.5551	0.0028	+17	-41
G. Sagittarii	6.1	+2.19	-10.2	-28 28.4	15 52.6	+11 14.1	-0.1551	0.5545	+0.0082	+ 7	-54
Sagittarii	3.5	2.48	7.6	27 48.1	**16** 11 31.0	+ 6 10.8	-0.2218	0.5470	0.0594	+ 8	-58
B. Sagittarii	6.2	2.51	7.7	28 46.5	11 45.1	+ 6 24.4	+0.8598	0.5469	0.0600	+61	+ 6
B. Sagittarii	5.9	2.60	6.3	28 2.3	19 20.8	-10 15.7	+0.5791	0.5433	0.0787	+54	-12
B. Sagittarii	5.7	2.62	5.6	27 10.1	21 46.9	- 7 54.6	-0.1795	0.5419	0.0845	+13	-55
Sagittarii	4.8	+2.78	- 3.5	-26 32.1	**17** 9 39.3	+ 3 33.7	+0.2913	0.5354	+0.1118	+40	-28
Sagittarii	4.9	2.78	3.2	26 26.1	11 6.5	+ 4 58.0	+0.3467	0.5346	0.1151	+43	-25
B. Capricorni	6.2	2.95	- 0.3	25 14.5	**18** 3 9.8	- 3 30.1	+1.1500	0.5251	0.1484	+65	+27
B. Capricorni	6.3	2.99	+ 1.1	24 5.7	6 41.8	- 0 4.8	+0.4186	0.5230	0.1551	+51	-22
Capricorni	5.3	3.04	3.9	21 32.8	20 44.6	-10 28.3	-0.0445	0.5150	0.1801	+30	-47
Capricorni	6.1	+3.04	+ 4.1	-20 54.5	21 14.6	- 9 59.2	-0.6600	0.5146	+0.1809	- 1	-90

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

OCTOBER.

THE STAR'S					AT CONJUNCTION IN R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1912.0.		Apparent Declination.	Washington Mean Time.	Hour Angle, *H*	*Y*	*x'*	*y'*	N.	S.
		Δα	Δδ								
		s	"	° '	d h m	h m				°	°
φ Capricorni	5.3	+3.06	+ 4.7	-21 1.0	**19** 0 18.3	- 7 1.2	+0.0202	0.5131	+0.1859	+34	-43
33 Capricorni	5.3	3.11	5.2	21 13.5	4 37.8	- 2 49.4	+1.0696	0.5107	0.1927	+69	+18
128 B. Capricorni	6.5	3.10	6.3	19 31.8	7 37.8	+ 0 5.2	-0.2207	0.5093	0.1972	+23	-57
37 Capricorni	5.7	3.14	6.4	20 28.5	10 7.1	+ 2 30.0	+1.3204	0.5080	0.2009	+70	+43
ε Capricorni	4.7	3.14	6.8	19 51.5	11 16.4	+ 3 37.3	+0.8712	0.5074	0.2025	+70	+ 3
κ Capricorni	4.8	+3.15	+ 7.4	-19 15.9	14 9.7	+ 6 25.4	+0.8058	0.5060	+0.2066	+71	- 1
152 B. Capricorni	6.5	3.13	8.6	17 15.2	18 7.8	+10 16.6	-0.5886	0.5042	0.2119	+ 7	-83
29 Aquarii (*mean*)	6.5	3.18	9.6	17 23.2	**20** 0 33.7	- 7 28.7	+0.9482	0.5015	0.2202	+73	+ 8
39 Aquarii	6.2	3.16	11.2	14 37.5	5 53.7	- 2 17.8	-0.9099	0.4994	0.2265	- 9	-90
45 Aquarii	6.1	3.17	12.0	13 44.6	9 25.4	+ 1 7.8	-1.0763	0.4980	0.2304	-19	-90
50 Aquarii	5.9	+3.20	+12.3	-13 58.3	12 20.8	+ 3 58.2	-0.1443	0.4972	+0.2335	+32	-51
182 B. Aquarii	6.2	3.21	12.9	13 21.8	15 21.3	+ 6 53.6	-0.1089	0.4963	0.2367	+34	-50
70 Aquarii	6.1	3.23	14.8	11 1.0	**21** 1 25.8	- 7 18.8	-0.2575	0.4937	0.2460	+28	-59
h Aquarii	5.4	3.23	16.7	8 9.9	10 35.1	+ 1 35.3	-1.1011	0.4920	0.2532	-18	-90
χ Aquarii	5.3	3.27	17.4	8 12.1	17 2.4	+ 7 52.0	+0.5891	0.4914	0.2575	+77	-14
317 B. Aquarii	6 3	+3.24	+18.0	- 6 23.0	19 10.1	+ 9 56.1	-0.8502	0.4912	+0.2588	- 1	-90
337 B. Aquarii	6.4	3.26	18.7	5 0.4	**22** 0 3.2	- 9 18.8	-1.0823	0.4910	0.2614	-15	-90
342 B. Aquarii	6.5	3.26	18.9	4 33.8	1 9.4	- 8 14.4	-1.2777	0.4910	0.2620	-30	-90
20 Piscium	5.6	3.29	20.2	3 14.7	10 14.7	+ 0 35.9	-0.3113	0.4914	0.2659	+28	-62
24 Piscium	6.1	3.31	20.3	3 38.3	13 0.0	+ 3 16.6	+0.8496	0.4917	0.2668	+86	0
80 B. Piscium	6.3	+3.31	+21.3	- 0 59.1	19 41.6	+ 9 47.2	-0.2391	0.4926	+0.2685	+32	-58
98 B. Piscium	6.3	3.33	22.2	+ 1 12.3	**23** 2 40.4	- 7 25.5	-0.7325	0.4942	0.2696	+ 7	-89
44 Piscium	6.0	3.34	22.5	1 27.5	6 49.9	- 3 22.9	+0.1160	0.4953	0.2698	+51	-38
147 B. Piscium	5.9	3.42	22.7	4 50.1	19 11.6	+ 8 38.0	-0.1896	0.4997	0.2685	+35	-54
171 B. Piscium	6.3	3.40	23.9	6 0.9	**24** 1 19.4	- 9 24.8	+0.1852	0.5023	0.2669	+55	-34
ε Piscium	4.4	+3.40	+24.1	+ 7 25.4	2 58.2	- 7 48.8	-0.8835	0.5031	+0.2663	- 2	-83
ζ Piscium	5.6	3.44	24.2	7 7.0	8 37.4	- 2 19.5	+0.9438	0.5060	0.2640	+90	+ 7
π Piscium	5.6	3.47	24.6	11 41.9	20 38.3	+ 9 20.1	-0.8062	0.5131	0.2568	+ 2	-78
12 H.[1] Arietis	6.3	3.53	24.3	13 3.6	**25** 9 20.8	- 2 20.7	+0.9484	0.5219	0.2458	+90	+10
19 Arietis	5.8	3 57	24.1	14 52.5	14 25.4	+ 2 34.4	+0.2644	0.5258	0.2403	+59	-26
27 Arietis	6.4	+3.61	+23.5	+17 19.3	22 55.2	+10 47.8	-0.3150	0.5326	+0.2297	+28	-54
36 Arietis	6.5	3.63	23.1	17 23.9	**26** 5 10.4	- 7 9.5	+1.0124	0.5378	0.2207	+90	+18
40 Arietis	6.0	3.64	23.0	17 55.4	7 6.5	- 5 17.2	+0.8848	0.5395	0.2177	+90	+11
47 Arietis	5.8	3.70	22.4	20 19.4	11 25.4	- 1 7.0	-0.7033	0.5432	0.2106	+ 7	-70
ε Arietis (*mean*)	4.6	3.69	22.3	20 59.7	11 56.2	- 0 37.2	-1.2991	0.5437	0.2097	-41	-69
ζ Arietis	5.0	+3.71	+21.6	+20 43.5	18 56.9	+ 6 8.9	+0.4120	0.5497	+0.1972	+70	-12
τ Arietis	5.1	3.72	21.3	20 50.2	21 43.6	+ 8 49.8	+0.8355	0.5522	0.1918	+90	+11
66 Arietis	6.1	3.75	20.6	22 30.4	**27** 0 50.9	+11 50.3	-0.3164	0.5549	0.1856	+27	-48
16 Tauri	5.4	3.78	19.6	24 1.1	7 50.3	- 5 25.3	-0.6422	0.5609	0.1705	+ 9	-64
17 Tauri	3.8	3.78	19.6	23 50.6	7 52.3	- 5 23.4	-0.4538	0.5609	0.1704	+20	-54
18 Tauri	5.6	+3.80	+19.5	+24 34.2	7 59.0	- 5 17.0	-1.1897	0.5610	+0.1702	-31	-65
q Tauri	4.3	3.79	19.5	24 11.8	8 0.5	- 5 15.5	-0.7992	0.5610	0.1701	0	-66
20 Tauri	4.1	3.79	19.5	24 5.9	8 16.3	- 5 0.3	-0.6520	0.5613	0.1695	+ 9	-64
21 Tauri	5.8	3.79	19.5	24 17.2	8 18.2	- 4 58.4	-0.8409	0.5613	0.1694	- 3	-66
22 Tauri	6.5	3.79	19.5	24 15.6	8 21.8	- 4 55.0	-0.8032	0.5613	0.1693	0	-66
23 Tauri	4.3	+3.78	+19.5	+23 40.8	8 29.3	- 4 47.8	-0.1803	0.5614	+0.1690	+34	-39
η Tauri	3.0	3.78	19.4	23 50.3	8 58.6	- 4 19.5	-0.2631	0.5619	0.1679	+30	-43
104 B. Tauri	5.5	3.77	19.5	23 9.4	9 21.0	- 3 58.0	+0.5078	0.5622	0.1670	+78	- 4
27 Tauri	3.7	3.78	19.3	23 47.4	9 41.1	- 3 38.6	-0.0940	0.5625	0.1663	+39	-34
28 Tauri	5.2	3.79	19.3	23 52.4	9 41.6	- 3 38.1	-0.1793	0.5625	0.1662	+34	-39
36 Tauri	5.6	+3.79	+18.4	+23 52.2	16 2.0	+ 2 28.1	+0.8316	0.5677	+0.1512	+90	+16
f Tauri	5.6	3.84	17.5	26 15.4	18 39.9	+ 5 0.2	-1.2511	0.5699	0.1446	-40	-64
χ Tauri	5.3	3.82	16.8	25 25.6	23 28.1	+ 9 37.4	+0.2734	0.5735	0.1322	+61	-12
17 B. Aurigæ	6.0	3.86	14.1	27 45.3	**28** 11 29.3	- 2 49.5	-0.7360	0.5819	0.0988	+ 2	-62
38 B. Aurigæ	6.5	3.84	13.1	27 34.6	16 8.0	+ 1 38.2	-0.1256	0.5845	0.0851	+37	-28
B. *Aurigæ*	6.0	+3.84	+12.7	+27 55.4	18 7.1	+ 3 32.5	-0.3186	0.5856	+0.0791	+26	-38

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

OCTOBER.

The Star's					At Conjunction in R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1912.0. Δα	Red'ns from 1912.0. Δδ	Apparent Declination.	Washington Mean Time.	Hour Angle, H	Y	x'	y'	N.	S.
		s	"	° ′	d h m	h m				°	°
354 B. Tauri	6.4	+3.82	+11.7	+27 52.3	**28** 22 28.4	+ 7 43.3	+0.0500	0.5877	+0.0657	+47	-17
22 Aurigæ	6.4	3.85	11.3	28 51.4	23 22.7	+ 8 35.3	-0.9030	0.5880	0.0629	- 9	-61
β Tauri	1.8	3.83	11.0	28 32.2	**29** 0 30.2	+ 9 40.1	-0.5056	0.5886	0.0594	+16	-47
107 B. Aurigæ	6.5	3.78	10.5	27 36.5	4 13.0	-10 46.2	+0.6461	0.5900	0.0477	+90	+15
116 B. Aurigæ	5.9	3.82	9.8	29 10.1	5 28.9	- 9 33.4	-0.8954	0.5904	0.0437	- 9	-61
406 B. Tauri	5.6	+3.76	+ 9.1	+27 56.7	9 56.9	- 5 16.4	+0.5213	0.5917	+0.0293	+81	+10
136 Tauri	4.6	3.74	9.0	27 35.7	10 51.0	- 4 24.5	+0.9048	0.5919	0.0264	+90	+32
154 B. Aurigæ	6.4	3.77	8.3	28 55.9	12 3.5	- 3 14.9	-0.4342	0.5921	0.0225	+20	-40
415 B. Tauri	6.1	3.72	8.3	27 34.3	13 46.1	- 1 36.5	+0.9919	0.5926	0.0169	+90	+38
183 B. Aurigæ	6.3	3.76	7.3	29 31.3	15 46.1	+ 0 18.5	-0.9771	0.5928	+0.0104	-15	-60
κ Aurigæ	4.4	+3.73	+ 6.2	+29 32.0	19 10.9	+ 3 34.9	-0.9710	0.5932	-0.0007	-15	-60
211 B. Aurigæ	6.3	3.71	5.9	29 35.0	21 22.7	+ 5 41.2	-1.0314	0.5933	0.0079	-20	-60
49 Aurigæ	5.1	3.62	5.1	28 5.6	**30** 2 42.0	+10 47.3	+0.4020	0.5932	0.0254	+71	+ 4
53 Aurigæ	5.6	3.63	4.5	29 3.7	3 53.3	+11 55.6	-0.6191	0.5931	0.0293	+ 9	-53
54 Aurigæ	5.8	3.61	4.6	28 20.6	4 20.5	-11 38.3	+0.1009	0.5930	0.0308	+50	-11
28 Geminorum	5.5	+3.61	+ 3.9	+29 3.7	6 18.1	- 9 45.5	-0.6990	0.5929	-0.0371	+ 4	-59
47 Geminorum	5.6	3.43	2.1	27 0.1	16 27.2	- 0 1.5	+0.8563	0.5905	0.0698	+90	+25
53 Geminorum	5.9	3.44	1.4	28 3.1	18 10.9	+ 1 38.0	-0.3375	0.5900	0.0752	+25	-39
134 B. Geminorum	6.5	3.40	1.6	26 51.0	18 37.2	+ 2 3.2	+0.8533	0.5898	0.0766	+90	+25
59 Geminorum	5.7	3.39	0.7	27 48.5	21 28.8	+ 4 47.8	-0.3555	0.5888	0.0855	+24	-40
ι Geminorum	3.9	+3.38	+ 0.5	+27 58.4	21 56.0	+ 5 13.9	-0.5623	0.5886	-0.0869	+13	-53
b^1 Geminorum	5.0	3.38	0.1	28 18.0	23 18.8	+ 6 33.3	-1.0171	0.5880	0.0912	-18	-62
b^2 Geminorum	5.0	3.37	+ 0.1	28 5.9	23 29.9	+ 6 44.0	-0.8287	0.5879	0.0918	- 4	-62
υ Geminorum	4.3	3.31	- 0.2	27 5.5	**31** 1 52.2	+ 9 0.4	-0.0313	0.5869	0.0990	+43	-24
c Geminorum	5.5	3.24	0.4	25 59.6	5 3.5	-11 56.0	+0.7540	0.5855	0.1086	+90	+16
φ Geminorum	5.0	+3.22	- 1.6	+26 59.6	8 42.0	- 8 26.3	-0.6771	0.5835	-0.1193	+ 6	-62
ω Cancri	5.9	3.14	1.7	25 38.0	11 37.8	- 5 37.5	+0.3423	0.5819	0.1277	+66	- 8
4 Cancri	6.2	3.13	1.7	25 19.9	11 57.0	- 5 19.0	+0.6080	0.5817	0.1286	+88	+ 6
ψ Cancri	5.9	3.09	2.9	25 46.5	15 23.3	- 2 0.9	-0.3001	0.5797	0.1383	+28	-42
λ Cancri	5.9	2.99	3.0	24 18.0	19 25.0	+ 1 51.3	+0.6177	0.5772	0.1492	+89	+ 4
28 Cancri	6.1	+2.95	- 3.7	+24 26.2	22 39.2	+ 4 58.0	-0.0185	0.5750	-0.1578	+43	-29
υ^1 Cancri	5.7	+2.93	- 3.9	+24 22.6	23 49.4	+ 6 5.4	-0.1448	0.5743	-0.1608	+36	-36

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υ^2 Cancri	6.4	+2.92	- 4.0	+24 23.0	**1** 0 25.5	+ 6 40.2	-0.2484	0.5739	-0.1623	+31	-41
ξ Cancri	5.2	2.66	6.1	22 24.0	15 24.5	- 2 54.8	-0.9420	0.5633	0.1977	- 9	-68
79 Cancri	6.1	2.66	6.1	22 21.2	15 49.4	- 2 30.8	-0.9758	0.5630	0.1986	-11	-68
90 H.^{1} Cancri	6.1	2.62	6.2	21 38.7	17 12.5	- 1 10.8	-0.5358	0.5620	0.2016	+16	-61
57 B. Leonis	6.5	2.38	7.6	19 16.0	**2** 6 27.6	+11 35.5	-0.9738	0.5527	0.2272	-10	-71
107 B. Leonis	6.3	+2.20	- 7.8	+16 11.0	15 49.5	- 3 22.4	-0.0549	0.5466	-0.2424	+41	-41
η Leonis	3.6	2.20	8.3	17 11.4	16 32.9	- 2 40.6	-1.2486	0.5461	0.2435	-31	-73
37 Leonis	5.5	2.10	7.9	14 9.9	20 46.0	+ 1 23.8	+0.7729	0.5436	0.2496	+90	+ 1
42 Leonis	6.1	2.09	8.6	15 25.0	23 5.4	+ 3 38.5	-1.0774	0.5421	0.2525	-16	-75
l Leonis	5.3	1.88	8.7	11 0.5	**3** 11 42.0	- 8 10.5	+0.1049	0.5354	0.2669	+50	-36
χ Leonis	4.7	+1.74	- 8.6	+ 7 48.6	19 5.8	- 1 1.3	+1.3451	0.5322	-0.2734	+90	+40
308 B. Leonis	5.8	1.72	9.3	8 32.4	23 19.8	+ 3 4.4	-0.5588	0.5306	0.2765	+16	-75
σ Leonis	4.1	1.65	8.9	6 30.6	**4** 2 42.9	+ 6 21.0	+0.5596	0.5294	0.2787	+79	-15
β Virginis	3.8	1.52	9.4	2 15.5	16 50.7	- 3 58.3	+0.8886	0.5258	0.2845	+90	+ 2
27 B. Virginis	6.5	1.44	9.2	+ 1 1.0	20 55.2	- 0 1.7	+0.9880	0.5252	0.2853	+90	+ 8
13 Virginis	5.9	+1.36	- 9.8	- 0 18.0	**5** 6 24.8	+ 9 9.9	-0.3825	0.5245	-0.2856	-25	-66
η Virginis	4.0	1.35	9.8	0 10.8	7 1.0	+ 9 45.0	-0.6772	0.5244	0.2854	+10	-89
319 B. Virginis	6.3	1.22	9.7	5 49.4	20 24.3	- 1 17.1	+1.2717	0.5251	0.2819	+84	+29
g Virginis	5.6	+1.16	- 9.9	- 8 31.0	**6** 6 31.4	+ 8 30.7	+1.2007	0.5267	-0.2764	+81	+23
				NEW	*MOON.*						

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

NOVEMBER.

THE STAR'S					AT CONJUNCTION IN R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1912.0.		Apparent Declination.	Washington Mean Time.	Hour Angle, *H*	*Y*	*x'*	*y'*	N.	S.
		$\Delta\alpha$	$\Delta\delta$								
		s	"	° '	d h m	h m				°	°
118 B. Ophiuchi	6.2	+1.46	−11.4	−26 23.9	**10** 17 0.2	− 8 40.5	−1.1638	0.5633	−0.0788	−46	−90
95 G. Ophiuchi	6.1	1.50	11.5	27 39.4	19 18.5	− 6 27.2	+0.0086	0.5635	0.0725	+21	−44
43 Ophiuchi	5.4	1.55	11.3	28 3.7	23 53.9	− 2 2.0	+0.1385	0.5636	0.0598	+27	−36
163 G. Ophiuchi	6.3	1.65	10.7	27 50.7	**11** 8 17.0	+ 6 2.5	−0.4981	0.5630	0.0364	− 8	−78
X Sagittarii (*var.*)	4.4	1.67	10.5	27 48.1	10 4.9	+ 7 46.5	−0.6073	0.5628	0.0314	−14	−90
10 G. Sagittarii	5.7	+1.72	−10.2	−28 3.3	13 55.7	+11 28.7	−0.4351	0.5621	−0.0207	− 6	−73
210 B. Scorpii	5.8	1.74	10.4	28 45.2	14 44.5	−11 44.3	+0.3031	0.5620	0.0184	+32	−27
W Sagittarii (*var.*)	4.3	1.78	10.3	29 35.3	17 25.1	− 9 9.5	+1.1668	0.5614	0.0110	+60	+34
38 B. Sagittarii	4.7	1.78	10.0	28 28.2	18 44.1	− 7 53.4	−0.0535	0.5611	0.0074	+12	−48
C. D. −28° 14268	6.4	1.81	9.9	28 55.4	20 22.4	− 6 18.8	+0.4291	0.5607	−0.0028	+38	−20
48 G. Sagittarii	6.3	+1.84	− 9.8	−28 19.2	22 41.1	− 4 5.1	−0.2239	0.5601	+0.0035	+ 3	−58
62 B. Sagittarii	6.0	1.84	9.6	28 41.1	22 41.3	− 4 5.0	+0.1716	0.5601	0.0035	+23	−34
58 G. Sagittarii	6.1	1.86	9.4	28 28.4	**12** 0 39.0	− 2 11.6	−0.0456	0.5594	0.0090	+12	−47
τ Sagittarii	3.5	2.10	7.4	27 48.1	20 4.2	− 7 28.2	−0.0984	0.5512	0.0604	+14	−50
183 B. Sagittarii	6.2	2.12	7.4	28 46.5	20 18.1	− 7 14.8	+0.9792	0.5511	0.0610	+61	+15
234 B. Sagittarii	5.9	+2.20	− 6.2	−28 2.3	**13** 3 49.4	+ 0 0.7	+0.7046	0.5469	+0.0798	+61	− 4
248 B. Sagittarii	5.7	2.22	5.7	27 10.1	6 14.0	+ 2 20.3	−0.0497	0.5455	0.0856	+19	−47
ω Sagittarii	4.8	2.36	3.9	26 32.1	18 0.8	−10 16.9	+0.4266	0.5381	0.1128	+48	−20
A Sagittarii	4.9	2.37	3.7	26 26.1	19 27.4	− 8 53.2	+0.4828	0.5372	0.1161	+51	−17
40 B. Capricorni	6.2	2.53	− 1.2	25 14.5	**14** 11 25.7	+ 6 33.6	+1.2931	0.5265	0.1490	+65	+47
56 B. Capricorni	6.3	+2.58	+ 0.1	−24 5.8	14 57.0	+ 9 58.2	+0.5646	0.5242	+0.1557	+60	−13
χ Capricorni	5.3	2.65	2.5	21 32.8	**15** 4 58.7	− 0 26.4	+0.1075	0.5150	0.1802	+38	−38
27 Capricorni	6.1	2.65	2.7	20 54.6	5 28.7	+ 0 2.7	−0.5075	0.5147	0.1810	+ 7	−77
φ Capricorni	5.3	2.67	3.1	21 1.0	8 32.6	+ 3 1.0	+0.1733	0.5129	0.1859	+42	−35
33 Capricorni	5.3	2.72	3.7	21 13.5	12 52.4	+ 7 13.0	+1.2236	0.5102	0.1925	+69	+32
128 B. Capricorni	6.5	+2.71	+ 4.7	−19 31.8	15 52.8	+10 8.0	−0.0660	0.5085	+0.1970	+31	−43
ε Capricorni	4.7	2.76	5.1	19 51.6	19 32.0	−10 19.3	+1.0267	0.5064	0.2020	+70	+14
κ Capricorni	4.8	2.78	5.7	19 16.0	22 25.9	− 7 30.5	+0.9619	0.5049	0.2061	+71	+ 9
152 B. Capricorni	6.5	2.77	7.0	17 15.2	**16** 2 25.0	− 3 38.4	−0.4328	0.5027	0.2112	+15	−70
29 Aquarii (*mean*)	6.5	2.83	7.8	17 23.2	8 52.8	+ 2 38.2	+1.1056	0.4996	0.2192	+73	−19
39 Aquarii	6.2	+2.82	+ 9.4	−14 37.5	14 14.8	+ 7 51.0	−0.7550	0.4972	+0.2253	0	−90
45 Aquarii	6.1	2.84	10.2	13 44.6	17 47.8	+11 18.0	−0.9221	0.4958	0.2291	− 9	−90
50 Aquarii	5.9	2.87	10.5	13 58.4	20 44.5	− 9 50.3	+0.0110	0.4947	0.2322	+40	−44
182 B. Aquarii	6.2	2.90	11.1	13 21.8	23 46.3	− 6 53.6	+0.0458	0.4937	0.2352	+42	−42
70 Aquarii	6.1	2.94	13.0	11 1.0	**17** 9 55.8	+ 2 59.0	−0.1061	0.4907	0.2441	+36	−50
h Aquarii	5.4	+2.97	+15.0	− 8 9.9	19 9.9	+11 57.9	−0.9555	0.4889	+0.2510	− 8	−90
χ Aquarii	5.3	3.02	15.6	8 12.1	**18** 1 40.7	− 5 41.8	+0.7348	0.4881	0.2552	+82	− 6
317 B. Aquarii	6.3	3.00	16.4	6 23.0	3 49.6	− 3 36.5	−0.7091	0.4879	0.2564	+ 7	−90
337 B. Aquarii	6.4	3.04	17.2	5 0.4	8 45.5	+ 1 11.4	−0.9448	0.4878	0.2590	− 6	−90
342 B. Aquarii	6.5	3.05	17.5	4 33.8	9 52.3	+ 2 16.4	−1.1415	0.4878	0.2595	−19	−90
20 Piscium	5.6	+3.10	+18.8	− 3 14.7	19 2.4	+11 11.5	−0.1801	0.4883	+0.2633	+35	−54
24 Piscium	6.1	3.13	18.9	3 38.3	21 49.1	−10 6.3	+0.9807	0.4886	0.2642	+86	+ 8
80 B. Piscium	6.3	3.16	20.2	− 0 59.2	**19** 4 34.0	− 3 32.4	−0.1165	0.4898	0.2660	+38	−50
98 B. Piscium	6.3	3.20	21.3	+ 1 12.3	11 35.9	+ 3 17.9	−0.6178	0.4915	0.2670	+13	−83
44 Piscium	6.0	3.23	21.6	1 27.5	15 47.0	+ 7 22.1	+0.2272	0.4927	0.2673	+57	−33
147 B. Piscium	5.9	+3.36	+22.1	+ 4 50.1	**20** 4 12.5	− 4 33.2	−0.0936	0.4977	+0.2663	+39	−49
171 B. Piscium	6.3	3.36	23.5	6 0.9	10 21.4	+ 1 25.2	+0.2729	0.5008	0.2649	+59	−30
ε Piscium	4.4	3.37	24.0	7 25.4	12 0.4	+ 3 1.4	−0.7977	0.5018	0.2643	+ 3	−83
ζ Piscium	5.6	3.43	23.9	7 7.0	17 40.1	+ 8 31.2	+1.0203	0.5051	0.2622	+90	+12
π Piscium	5.6	3.53	25.0	11 41.9	**21** 5 40.2	− 3 50.1	−0.7446	0.5132	0.2554	+ 6	−78
12 H.[1] Arietis	6.3	+3.66	+24.9	+13 3.6	18 19.3	+ 8 25.7	+0.9846	0.5232	+0.2448	+90	+13
19 Arietis	5.8	3.72	24.9	14 52.5	23 21.8	−10 41.4	+0.2950	0.5276	0.2395	+61	−24
27 Arietis	6.4	3.82	24.7	17 19.3	**22** 7 46.9	− 2 32.6	−0.2953	0.5352	0.2292	+29	−52
36 Arietis	6.5	3.88	24.2	17 23.9	13 57.8	+ 3 25.9	+1.0139	0.5412	0.2204	+90	+19
40 Arietis	6.0	3.90	24.1	17 55.4	15 52.4	+ 5 16.6	+0.8838	0.5430	0.2175	+90	+11
47 Arietis	5.8	+3.99	+23.9	+20 19.4	20 7.8	+ 9 23.3	−0.7007	0.5471	+0.2105	+ 7	−70

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

NOVEMBER.

THE STAR'S					AT CONJUNCTION IN R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1912.0.		Apparent Declination.	Washington Mean Time.	Hour Angle, H	Y	x'	y'	N.	S.
		Δα	Δδ								
		s	″	° ′	d h m	h m				°	°
ε Arietis (*mean*)	4.6	+3.98	+23.9	+20 59.7	**22** 20 38.1	+ 9 52.6	-1.2930	0.5476	+0.2096	-40	-69
ζ Arietis	5.0	4.04	23.0	20 43.5	**23** 3 32.4	- 7 27.7	+0.3944	0.5545	0.1972	+68	-13
τ Arietis	5.1	4.07	22.7	20 50.2	6 16.3	- 4 49.7	+0.8097	0.5572	0.1919	+90	+10
66 Arietis	6.1	4.13	22.3	22 30.4	9 20.3	- 1 52.4	-0.3375	0.5603	0.1857	+26	-49
16 Tauri	5.4	4.22	21.3	24 1.2	16 11.9	+ 4 44.2	-0.6711	0.5670	0.1707	+ 7	-65
17 Tauri	3.8	+4.21	+21.3	+23 50.6	16 13.8	+ 4 46.0	-0.4846	0.5670	+0.1706	+18	-55
18 Tauri	5.6	4.23	21.3	24 34.2	16 20.4	+ 4 52.3	-1.2137	0.5671	0.1704	-33	-65
q Tauri	4.3	4.22	21.3	24 11.9	16 21.8	+ 4 53.7	-0.8268	0.5671	0.1703	- 2	-66
20 Tauri	4.1	4.22	21.2	24 6.0	16 37.3	+ 5 8.5	-0.6814	0.5674	0.1697	+ 7	-65
21 Tauri	5.8	4.22	21.2	24 17.2	16 39.2	+ 5 10.4	-0.8686	0.5674	0.1696	- 5	-66
22 Tauri	6.5	+4.22	+21.2	+24 15.6	16 42.7	+ 5 13.7	-0.8314	0.5675	+0.1695	- 2	-66
23 Tauri	4.3	4.21	21.2	23 40.8	16 50.1	+ 5 20.9	-0.2144	0.5676	0.1692	+32	-41
η Tauri	3.0	4.22	21.1	23 50.4	17 18.8	+ 5 48.5	-0.2973	0.5680	0.1682	+28	-45
104 B. Tauri	5.5	4.21	21.0	23 9.4	17 40.7	+ 6 9.6	+0.4659	0.5684	0.1673	+73	- 6
27 Tauri	3.7	4.22	21.0	23 47.5	18 0.4	+ 6 28.6	-0.1308	0.5688	0.1665	+37	-36
28 Tauri	5.2	+4.23	+21.0	+23 52.5	18 1.0	+ 6 29.2	-0.2152	0.5689	+0.1665	+32	-40
33 Tauri	6.0	4.23	20.4	22 55.6	21 16.1	+ 9 36.9	+1.2868	0.5719	0.1588	+90	+53
36 Tauri	5.6	4.27	19.9	23 52.2	**24** 0 13.4	-11 32.7	+0.7758	0.5746	0.1515	+90	+13
p Tauri	5.6	4.35	19.3	26 15.4	2 47.9	- 9 4.0	-1.2898	0.5770	0.1448	-49	-64
χ Tauri	5.3	4.36	18.3	25 25.6	7 29.6	- 4 33.4	+0.2117	0.5811	0.1323	+57	-15
17 B. Aurigæ	6.0	+4.49	+15.5	+27 45.3	19 13.6	+ 6 42.5	-0.8039	0.5902	+0.0987	- 2	-62
38 B. Aurigæ	6.5	4.50	14.3	27 34.7	23 45.3	+11 3.1	-0.2070	0.5931	0.0848	+32	-32
47 B. Aurigæ	6.0	4.51	13.8	27 55.4	**25** 1 41.4	-11 5.5	-0.4005	0.5943	0.0787	+22	-42
354 B. Tauri	6.4	4.52	12.7	27 52.3	5 56.0	- 7 1.4	-0.0423	0.5965	0.0652	+42	-22
22 Aurigæ	6.4	4.56	12.3	28 51.4	6 48.9	- 6 10.8	-0.9851	0.5970	0.0624	-16	-61
β Tauri	1.8	+4.55	+11.9	+28 32.2	7 54.6	- 5 7.8	-0.5941	0.5975	+0.0588	+10	-53
107 B. Aurigæ	6.5	4.52	11.1	27 36.5	11 31.6	- 1 39.9	+0.5387	0.5990	0.0470	+82	+10
116 B. Aurigæ	5.9	4.58	10.6	29 10.1	12 45.6	- 0 29.0	-0.9859	0.5995	0.0429	-16	-61
406 B. Tauri	5.6	4.53	9.6	27 56.7	17 6.6	+ 3 41.0	+0.4078	0.6009	0.0284	+71	+ 4
136 Tauri	4.6	4.51	9.3	27 35.7	17 59.3	+ 4 31.5	+0.7856	0.6011	0.0254	+90	+25
154 B. Aurigæ	6.4	+4.56	+ 8.8	+28 55.9	19 9.8	+ 5 39.0	-0.5391	0.6014	+0.0214	+14	-47
415 B. Tauri	6.1	4.51	8.5	27 34.3	20 49.8	+ 7 14.7	+0.8679	0.6016	0.0158	+90	+31
183 B. Aurigæ	6.3	4.58	7.6	29 31.3	22 46.7	+ 9 6.7	-1.0804	0.6020	+0.0092	-24	-60
κ Aurigæ	4.4	4.56	6.4	29 32.0	**26** 2 6.2	-11 42.3	-1.0788	0.6023	-0.0020	-24	-60
211 B. Aurigæ	6.3	4.56	6.0	29 35.0	4 14.6	- 9 39.4	-1.1414	0.6024	0.0094	-31	-60
49 Aurigæ	5.1	+4.48	+ 4.6	+28 5.6	9 25.7	- 4 41.5	+0.2685	0.6022	-0.0270	+61	- 3
53 Aurigæ	5.6	4.51	4.1	29 3.7	10 35.3	- 3 34.9	-0.7423	0.6020	0.0310	+ 1	-61
54 Aurigæ	5.8	4.48	4.1	28 20.6	11 1.8	- 3 9.5	-0.0312	0.6020	0.0325	+42	-18
28 Geminorum	5.5	4.50	3.3	29 3.7	12 56.4	- 1 19.8	-0.8243	0.6017	0.0389	- 4	-61
47 Geminorum	5.6	4.34	0.7	27 0.1	22 50.9	+ 8 9.7	+0.7013	0.5988	0.0719	+90	+16
53 Geminorum	5.9	+4.37	0.0	+28 3.1	**27** 0 32.2	+ 9 46.8	-0.4815	0.5981	-0.0774	+17	-47
134 B. Geminorum	6.5	4.32	+ 0.1	26 50.9	0 57.9	+10 11.4	+0.6960	0.5980	0.0788	+90	+15
59 Geminorum	5.7	4.33	- 0.9	27 48.5	3 45.6	-11 8.0	-0.5033	0.5968	0.0878	+16	-49
ι Geminorum	3.9	4.32	1.1	27 58.4	4 12.2	-10 42.4	-0.7084	0.5966	0.0892	+ 4	-62
b^1 Geminorum	5.0	4.32	1.6	28 18.0	5 33.2	- 9 24.8	-1.1602	0.5959	0.0935	-31	-62
b^2 Geminorum	5.0	+4.32	- 1.6	+28 5.9	5 44.0	- 9 14.5	-0.9739	0.5958	-0.0940	-14	-62
υ Geminorum	4.3	4.26	2.1	27 5.5	8 3.3	- 7 1.0	-0.1875	0.5945	0.1013	+34	-32
ε Geminorum	5.5	4.18	2.6	25 59.6	11 10.6	- 4 1.4	+0.5865	0.5927	0.1109	+86	+ 6
φ Geminorum	5.0	4.18	3.9	26 59.6	14 44.6	- 0 36.2	-0.8349	0.5905	0.1216	- 4	-63
ω Cancri	5.9	4.10	4.3	25 38.0	17 37.1	+ 2 9.3	+0.1721	0.5886	0.1301	+55	-17
4 Cancri	6.2	+4.08	- 4.3	+25 19.9	17 55.9	+ 2 27.3	+0.4350	0.5884	-0.1310	+72	- 3
ψ Cancri	5.9	4.05	5.7	25 46.4	21 18.5	+ 5 41.8	-0.4686	0.5859	0.1406	+18	-51
λ Cancri	5.9	3.96	6.0	24 17.9	**28** 1 16.0	+ 9 29.7	+0.4376	0.5830	0.1515	+72	- 5
28 Cancri	6.1	3.92	7.0	24 26.1	4 27.1	-11 26.8	-0.1965	0.5806	0.1600	+33	-38
ν^1 Cancri	5.7	3.90	7.2	24 22.6	5 36.2	-10 20.4	-0.3230	0.5796	0.1630	+27	-45
ν^2 Cancri	6.4	3.89	- 7.4	+24 23.0	6 11.8	- 9 46.2	-0.4265	0.5792	-0.1645	+21	-51

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

NOVEMBER.

THE STAR'S					AT CONJUNCTION IN R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1912.0. Δα	Red'ns from 1912.0. Δδ	Apparent Declination.	Washington Mean Time.	Hour Angle, H	Y	x'	y'	N.	S.
		s	"	° '	d h m	h m				°	°
ξ Cancri	5.2	+3.63	−10.3	+22 24.0	**28** 20 59.7	+ 4 27.6	−1.1297	0.5667	−0.1993	−23	−68
79 Cancri	6.1	3.62	10.4	22 21.1	21 24.3	+ 4 51.3	−1.1637	0.5664	0.2002	−26	−68
90 H.[1] Cancri	6.1	3.58	10.5	21 38.6	22 46.7	+ 6 10.6	−0.7269	0.5652	0.2031	+ 5	−68
57 B. Leonis	6.5	3.33	12.5	19 15.9	**29** 11 56.8	− 5 8.0	−1.1733	0.5541	0.2280	−25	−71
107 B. Leonis	6.3	3.12	13.0	16 11.0	21 17.6	+ 3 53.0	−0.2604	0.5467	0.2426	+30	−51
37 Leonis	5.5	+3.01	−13.2	+14 9.8	**30** 2 14.3	+ 8 39.5	+0.5661	0.5430	−0.2492	+80	−10
42 Leonis	6.1	3.00	14.0	15 24.9	4 34.0	+10 54.4	−1.2853	0.5413	0.2521	−34	−75
l Leonis	5.3	2.76	14.3	11 0.4	17 14.6	− 0 50.5	−0.1023	0.5331	0.2655	+39	−47
DECEMBER.											
χ Leonis	4.7	+2.59	−14.1	+ 7 48.5	**1** 0 42.4	+ 6 22.7	+1.1444	0.5290	−0.2713	+90	+21
308 B. Leonis	5.8	2.57	15.0	8 32.3	4 59.2	+10 31.2	−0.7654	0.5270	0.2742	+ 5	−81
σ Leonis	4.1	2.49	14.5	6 30.5	8 24.7	−10 9.8	+0.3596	0.5255	0.2760	+65	−25
β Virginis	3.8	2.33	14.8	2 15.4	22 45.1	+ 3 43.3	+0.7016	0.5208	0.2808	+90	− 8
27 B. Virginis	6.5	+2.22	−14.4	+ 1 1.0	**2** 2 53.8	+ 7 44.4	+0.8059	0.5200	−0.2814	+90	− 3
13 Virginis	5.9	2.12	14.8	− 0 18.1	12 34.1	− 6 53.3	−0.5651	0.5187	0.2812	+16	−79
η Virginis	4.0	2.11	14.9	0 10.9	13 11.0	− 6 17.5	−0.8615	0.5187	0.2811	− 1	−90
319 B. Virginis	6.3	1.95	14.1	5 49.4	**3** 2 51.0	+ 6 57.1	+1.1228	0.5188	0.2771	+84	+17
g Virginis	5.6	1.85	13.9	8 31.0	13 11.4	− 7 1.8	+1.0675	0.5203	0.2713	+81	+14
α Virginis	1.2	+1.78	−13.6	−10 42.4	21 20.4	+ 0 51.9	+1.1484	0.5222	−0.2652	+79	+20
h Virginis	5.4	1.76	14.0	9 42.9	**4** 1 8.1	+ 4 32.5	−0.8784	0.5233	0.2618	− 4	−90
86 Virginis	5.6	1.72	13.6	11 59.4	7 24.2	+10 36.7	−0.1408	0.5254	0.2556	+33	−52
621 B. Virginis	6.4	1.66	13.3	14 33.2	16 15.8	− 4 48.6	+0.3069	0.5289	0.2454	+55	−28
40 H. Virginis	5.1	1.64	13.1	15 53.4	19 17.3	− 1 53.0	+0.9664	0.5302	0.2414	+74	+ 8
47 G. Libræ	6.1	+1.56	−12.4	−21 41.6	**5** 21 1.0	− 1 0.4	+1.3457	0.5428	−0.2002	+68	+52
				NEW	*MOON.*						
τ Sagittarii	3.5	+2.00	− 6.5	−27 48.1	**10** 4 22.7	+ 2 38.1	+0.0631	0.5538	+0.0623	+23	−41
183 B. Sagittarii	6.2	2.02	6.4	28 46.5	4 36.6	+ 2 51.6	+1.1410	0.5537	0.0629	+61	−30
234 B. Sagittarii	5.9	+2.07	− 5.4	−28 2.3	12 6.2	+10 5.3	+0.8795	0.5496	+0.0817	+62	+ 5
248 B. Sagittarii	5.7	2.08	5.0	27 10.0	14 30.3	−11 35.6	+0.1295	0.5483	0.0876	+29	−37
ω Sagittarii	4.8	2.17	3.4	26 32.1	**11** 2 14.2	− 0 15.7	+0.6254	0.5410	0.1148	+59	− 9
A Sagittarii	4.9	2.17	− 3.3	26 26.1	3 40.4	+ 1 7.6	+0.6839	0.5399	0.1180	+63	− 6
56 B. Capricorni	6.3	2.33	0.0	24 5.8	23 6.2	− 4 4.8	+0.7964	0.5264	0.1575	+66	0
17 Capricorni	5.8	+2.28	+ 0.5	−21 50.1	**12** 2 3.2	− 1 13.5	−1.2295	0.5242	+0.1629	−43	−90
χ Capricorni	5.3	2.36	1.9	21 32.8	13 6.5	+ 9 29.2	+0.3590	0.5165	0.1818	+51	−25
27 Capricorni	6.1	2.37	2.1	20 54.6	13 36.4	+ 9 58.1	−0.2557	0.5162	0.1825	+20	−59
φ Capricorni	5.3	2.39	2.7	21 1.0	16 40.2	−11 3.7	+0.4293	0.5141	0.1874	+56	−21
128 B. Capricorni	6.5	2.42	3.9	19 31.9	**13** 0 0.6	− 3 56.4	+0.1989	0.5092	0.1981	+45	−33
ε Capricorni	4.7	+2.46	+ 4.2	−19 51.6	3 40.1	− 0 23.4	+1.2974	0.5070	+0.2032	+70	+40
κ Capricorni	4.8	2.48	4.8	19 16.0	6 34.4	+ 2 25.8	+1.2358	0.5053	0.2070	+71	+32
δ Capricorni	3.0	2.46	5.6	16 31.5	8 53.5	+ 4 40.9	−1.3186	0.5038	0.2099	−46	−90
152 B. Capricorni	6.5	2.47	5.8	17 15.3	10 34.0	+ 6 18.4	−0.1572	0.5028	0.2120	+29	−53
39 Aquarii	6.2	2.52	8.0	14 37.5	22 26.8	− 6 9.1	−0.4700	0.4965	0.2255	+15	−73
45 Aquarii	6.1	+2.54	+ 8.8	−13 44.6	**14** 2 1.1	− 2 40.9	−0.6352	0.4948	+0.2292	+ 7	−86
50 Aquarii	5.9	2.57	9.0	13 58.4	4 58.9	+ 0 11.9	+0.3026	0.4935	0.2319	+56	−28
182 B. Aquarii	6.2	2.60	9.6	13 21.8	8 2.0	+ 3 9.9	+0.3396	0.4922	0.2348	+58	−26
70 Aquarii	6.1	2.64	11.4	11 1.0	18 16.6	−10 52.3	+0.1919	0.4886	0.2432	+52	−34
h Aquarii	5.4	2.68	13.3	8 9.9	**15** 3 36.5	− 1 47.6	−0.6596	0.4861	0.2496	+ 9	−87
φ Aquarii	4.4	+2.70	+14.1	− 6 31.2	8 46.7	+ 3 14.2	−1.1765	0.4852	+0.2525	−23	−90
χ Aquarii	5.3	2.73	13.8	8 12.2	10 12.0	+ 4 37.3	+1.0397	0.4850	0.2534	+82	+12
317 B. Aquarii	6.3	2.72	14.6	6 23.1	12 22.6	+ 6 44.3	−0.4121	0.4846	0.2545	+22	−68
337 B. Aquarii	6.4	2.76	15.4	5 0.5	17 22.4	+11 36.2	−0.6503	0.4842	0.2568	+10	−86
342 B. Aquarii	6.5	2.77	15.6	4 33.8	18 30.1	−11 18.0	−0.8484	0.4841	0.2573	− 1	−90
20 Piscium	5.6	+2.84	+17.0	− 3 14.8	**16** 3 48.4	− 2 14.6	+0.1152	0.4841	+0.2606	+50	−38

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

DECEMBER.

The Star's					At Conjunction in R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1912.0.		Apparent Declination.	Washington Mean Time.	Hour Angle, H	Y	x'	y'	N.	S.
		$\Delta\alpha$	$\Delta\delta$								
		s	"	° ′	d h m	h m				°	°
24 Piscium	6.1	+2.87	+17.1	− 3 38.4	**16** 6 37.6	+ 0 30.1	+1.2819	0.4843	+0.2614	+86	+30
80 B. Piscium	6.3	2.91	18.5	− 0 59.2	13 29.0	+ 7 10.5	+0.1732	0.4851	0.2628	+54	−35
98 B. Piscium	6.3	2.96	19.7	+ 1 12.3	20 37.9	− 9 52.1	−0.3377	0.4867	0.2635	+27	−63
44 Piscium	6.0	3.00	20.0	1 27.5	**17** 0 53.2	− 5 43.8	+0.5089	0.4878	0.2636	+75	−18
147 B. Piscium	5.9	3.16	20.6	4 50.1	13 31.6	+ 6 33.8	+0.1708	0.4925	0.2624	+54	−35
171 B. Piscium	6.3	+3.18	+22.3	+ 6 0.9	19 46.8	−11 21.5	+0.5308	0.4957	+0.2608	+76	−16
ε Piscium	4.4	3.18	22.8	7 25.4	21 27.5	− 9 43.6	−0.5495	0.4965	0.2602	+16	−75
ζ Piscium	5.6	3.27	22.8	7 7.0	**18** 3 12.9	− 4 8.0	+1.2712	0.4999	0.2581	+90	+32
π Piscium	5.6	3.40	24.3	11 41.9	15 24.4	+ 7 42.2	−0.5269	0.5082	0.2513	+17	−71
12 H.[1] Arietis	6.3	3.57	24.4	13 3.6	**19** 4 14.1	− 3 51.4	+1.1855	0.5187	0.2409	+90	+28
19 Arietis	5.8	+3.66	+24.7	+14 52.5	9 20.3	+ 1 5.2	+0.4811	0.5234	+0.2357	+74	−14
27 Arietis	6.4	3.79	24.8	17 19.3	17 50.7	+ 9 19.2	−0.1309	0.5316	0.2256	+37	−44
36 Arietis	6.5	3.88	24.3	17 23.9	**20** 0 4.8	− 8 39.0	+1.1672	0.5380	0.2170	+90	+30
40 Arietis	6.0	3.91	24.3	17 55.4	2 0.2	− 6 47.5	+1.0319	0.5400	0.2142	+90	+21
47 Arietis	5.8	4.02	24.4	20 19.4	6 17.3	− 2 39.1	−0.5664	0.5446	0.2074	+14	−64
ε Arietis (*mean*)	4.6	+4.02	+24.6	+20 59.7	6 47.8	− 2 9.6	−1.1610	0.5451	+0.2065	−25	−69
ζ Arietis	5.0	4.12	23.6	20 43.5	13 43.9	+ 4 32.0	+0.5118	0.5527	0.1943	+77	− 7
τ Arietis	5.1	4.16	23.3	20 50.2	16 28.2	+ 7 10.4	+0.9202	0.5557	0.1891	+90	+17
66 Arietis	6.1	4.24	23.1	22 30.5	19 32.6	+10 8.1	−0.2350	0.5591	0.1829	+31	−43
16 Tauri	5.4	4.37	22.3	24 1.2	**21** 2 24.2	− 7 15.4	−0.5852	0.5666	0.1682	+12	−61
17 Tauri	3.8	+4.36	+22.3	+23 50.6	2 26.1	− 7 13.6	−0.3989	0.5666	+0.1681	+22	−50
18 Tauri	5.6	4.38	22.4	24 34.2	2 32.6	− 7 7.4	−1.1274	0.5668	0.1679	−25	−65
q Tauri	4.3	4.37	22.4	24 11.9	2 34.1	− 7 5.9	−0.7411	0.5668	0.1677	+ 3	−66
20 Tauri	4.1	4.38	22.3	24 6.0	2 49.6	− 6 51.0	−0.5965	0.5671	0.1672	+12	−61
21 Tauri	5.8	4.38	22.3	24 17.2	2 51.4	− 6 49.2	−0.7834	0.5671	0.1671	0	−66
22 Tauri	6.5	+4.38	+22.3	+24 15.6	2 54.9	− 6 45.9	−0.7465	0.5672	+0.1670	+ 3	−66
23 Tauri	4.3	4.37	22.2	23 40.9	3 2.3	− 6 38.8	−0.1308	0.5673	0.1667	+37	−36
η Tauri	3.0	4.38	22.1	23 50.4	3 31.0	− 6 11.1	−0.2146	0.5678	0.1656	+32	−40
104 B. Tauri	5.5	4.37	21.9	23 9.5	3 52.9	− 5 50.1	+0.5464	0.5682	0.1648	+81	− 2
27 Tauri	3.7	4.39	22.0	23 47.5	4 12.6	− 5 31.1	−0.0502	0.5685	0.1641	+41	−32
28 Tauri	5.2	+4.39	+22.0	+23 52.5	4 13.1	− 5 30.6	−0.1345	0.5685	+0.1641	+37	−36
36 Tauri	5.6	4.48	20.8	23 52.2	10 24.3	+ 0 26.4	+0.8381	0.5752	0.1491	+90	+17
ρ Tauri	5.6	4.57	20.5	26 15.5	12 58.1	+ 2 54.3	−1.2278	0.5779	0.1426	−37	−64
χ Tauri	5.3	4.62	19.5	25 25.7	17 38.1	+ 7 23.3	+0.2569	0.5827	0.1302	+60	−13
17 B. Aurigæ	6.0	4.84	16.8	27 45.3	**22** 5 15.6	− 5 27.4	−0.7829	0.5933	0.0966	− 1	−62
38 B. Aurigæ	6.5	+4.88	+15.5	+27 34.7	9 43.9	− 1 10.2	−0.2009	0.5969	+0.0828	+33	−32
47 B. Aurigæ	6.0	4.91	15.1	27 55.5	11 38.4	+ 0 39.5	−0.3978	0.5983	0.0767	+22	−42
354 B. Tauri	6.4	4.95	13.8	27 52.4	15 49.3	+ 4 39.9	−0.0528	0.6013	0.0632	+41	−22
22 Aurigæ	6.4	5.00	13.6	28 51.4	16 41.4	+ 5 29.7	−0.9902	0.6018	0.0603	−16	−61
β Tauri	1.8	5.00	13.1	28 32.3	17 46.1	+ 6 31.7	−0.6048	0.6024	0.0568	+10	−54
107 B. Aurigæ	6.5	+4.99	+12.0	+27 36.5	21 19.4	+ 9 55.9	+0.5093	0.6044	+0.0448	+79	+ 8
112 B. Aurigæ	5.7	4.96	11.8	26 52.4	21 46.8	+10 22.2	+1.2680	0.6046	0.0433	+90	+61
116 B. Aurigæ	5.9	5.06	11.7	29 10.1	22 32.1	+11 5.5	−1.0047	0.6050	0.0407	−18	−61
406 B. Tauri	5.6	5.04	10.3	27 56.7	**23** 2 48.2	− 8 49.3	+0.3654	0.6069	0.0261	+68	+ 2
136 Tauri	4.6	5.03	10.0	27 35.7	3 39.9	− 7 59.9	+0.7374	0.6073	0.0231	+90	+22
154 B. Aurigæ	6.4	+5.09	+ 9.6	+28 55.9	4 49.0	− 6 53.8	−0.5771	0.6077	+0.0191	+11	−49
415 B. Tauri	6.1	5.05	9.1	27 34.3	6 27.0	− 5 20.0	+0.8115	0.6082	0.0134	+90	+27
183 B. Aurigæ	6.3	5.14	8.5	29 31.4	8 21.4	− 3 30.5	−1.1212	0.6088	+0.0068	−29	−60
κ Aurigæ	4.4	5.15	7.1	29 32.0	11 36.6	− 0 23.9	−1.1273	0.6095	−0.0047	−29	−60
211 B. Aurigæ	6.3	5.16	6.6	29 35.0	13 42.1	+ 1 36.2	−1.1939	0.6097	0.0120	−38	−60
49 Aurigæ	5.1	+5.11	+ 4.8	+28 5.6	18 45.9	+ 6 26.8	+0.1870	0.6101	−0.0299	+56	− 7
53 Aurigæ	5.6	5.15	4.4	29 3.7	19 53.7	+ 7 31.6	−0.8141	0.6101	0.0339	− 4	−61
54 Aurigæ	5.8	5.12	4.2	28 20.6	20 19.6	+ 7 56.3	−0.1128	0.6101	0.0354	+38	−23
28 Geminorum	5.5	5.16	3.6	29 3.7	22 11.4	+ 9 43.2	−0.9005	0.6099	0.0420	−10	−61
47 Geminorum	5.6	5.06	+ 0.1	27 0.1	**24** 7 50.1	− 5 3.2	+0.5815	0.6080	0.0754	+86	+ 9
53 Geminorum	5.9	+5.10	− 0.4	+28 3.1	9 28.6	− 3 28.9	−0.5890	0.6074	−0.0810	+11	−54

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

DECEMBER.

THE STAR'S					AT CONJUNCTION IN R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1912.0.		Apparent Declination.	Washington Mean Time.	Hour Angle, *H*	*Y*	*x'*	*y'*	N.	S.
		Δα	Δδ								
		s	"	° ′	d h m	h m				°	°
134 B. Geminorum	6.5	+5.05	− 0.6	+26 50.9	**24** 9 53.5	− 3 5.2	+0.5711	0.6073	−0.0824	+85	+ 8
59 Geminorum	5.7	5.08	1.5	27 48.5	12 36.6	− 0 29.1	−0.6180	0.6061	0.0915	+ 9	−57
ι Geminorum	3.9	5.07	1.8	27 58.4	13 2.4	− 0 4.4	−0.8213	0.6060	0.0930	− 3	−62
b^1 Geminorum	5.0	5.09	2.3	28 18.0	14 21.0	+ 1 10.9	−1.2697	0.6054	0.0973	−49	−62
b^2 Geminorum	5.0	5.08	2.3	28 5.9	14 31.6	+ 1 21.0	−1.0865	0.6053	0.0979	−24	−62
υ Geminorum	4.3	+5.03	− 3.0	+27 5.5	16 46.8	+ 3 30.4	−0.3166	0.6042	−0.1053	+26	−40
ε Geminorum	5.5	4.96	3.9	25 59.6	19 48.5	+ 6 24.4	+0.4386	0.6026	0.1150	+73	− 2
φ Geminorum	5.0	4.98	5.2	26 59.6	23 16.2	+ 9 43.2	−0.9698	0.6006	0.1260	−13	−63
ω Cancri	5.9	4.91	6.0	25 38.0	**25** 2 3.4	−11 36.6	+0.0154	0.5987	0.1345	+45	−25
4 Cancri	6.2	4.90	6.0	25 19.8	2 21.6	−11 19.1	+0.2736	0.5985	0.1355	+61	−12
ψ Cancri	5.9	+4.89	− 7.5	+25 46.4	5 37.9	− 8 11.0	−0.6238	0.5962	−0.1452	+ 9	−60
λ Cancri	5.9	4.80	8.2	24 17.9	9 28.1	− 4 30.3	+0.2594	0.5932	0.1563	+60	−15
28 Cancri	6.1	4.78	9.3	24 26.1	12 33.2	− 1 32.8	−0.3719	0.5908	0.1648	+24	−48
$υ^1$ Cancri	5.7	4.76	9.6	24 22.5	13 40.1	− 0 28.7	−0.4990	0.5899	0.1679	+17	−56
$υ^2$ Cancri	6.4	4.75	9.8	24 22.9	14 14.6	+ 0 4.4	−0.6021	0.5893	0.1694	+11	−61
γ Cancri	4.7	+4.61	−10.5	+21 47.0	18 15.8	+ 3 55.9	+1.2713	0.5859	−0.1800	+90	+48
ξ Cancri	5.2	4.53	13.6	22 23.9	**26** 4 34.6	−10 9.7	−1.3257	0.5767	0.2046	−48	−68
90 H.[1] Cancri	6.1	4.48	13.9	21 38.5	6 18.2	− 8 30.2	−0.9330	0.5751	0.2084	− 8	−68
107 B. Leonis	6.3	4.05	17.7	16 10.9	**27** 4 8.8	−11 28.3	−0.5150	0.5552	0.2476	+17	−66
34 Leonis	6.4	3.96	17.6	13 47.1	6 44.9	− 8 57.8	+1.2262	0.5530	0.2512	+90	+32
37 Leonis	5.5	+3.94	−18.1	+14 9.8	8 57.3	− 6 50.0	+0.2923	0.5511	−0.2541	+61	−24
l Leonis	5.3	3.69	19.8	11 0.3	23 34.9	+ 7 17.3	−0.3866	0.5398	0.2696	+24	−63
χ Leonis	4.7	3.52	19.9	7 48.4	**28** 6 52.8	− 9 39.4	+0.8392	0.5350	0.2750	+90	+ 1
308 B. Leonis	5.8	3.51	20.8	8 32.2	11 4.4	− 5 36.1	−1.0539	0.5324	0.2773	−13	−81
σ Leonis	4.1	3.42	20.4	6 30.4	14 26.0	− 2 21.1	+0.0576	0.5306	0.2790	+47	−40
89 Leonis	5.7	+3.30	−20.3	+ 3 32.6	20 44.0	+ 3 44.7	+1.2869	0.5274	−0.2812	+90	+32
β Virginis	3.8	3.26	20.8	2 15.3	**29** 4 32.6	+11 18.2	+0.3919	0.5242	0.2827	+66	−24
27 B. Virginis	6.5	3.15	20.4	+ 1 0.9	8 38.2	− 8 43.9	+0.4956	0.5228	0.2828	+74	−19
13 Virginis	5.9	3.04	20.8	− 0 18.2	18 12.6	+ 0 32.5	−0.8660	0.5204	0.2817	− 1	−90
η Virginis	4.0	3.03	20.9	0 11.0	18 49.2	+ 1 7.9	−1.1608	0.5203	0.2816	−20	−90
319 B. Virginis	6.3	+2.86	−19.7	− 5 49.5	**30** 8 24.4	− 9 42.2	+0.8239	0.5189	−0.2764	+84	− 1
g Virginis	5.6	2.75	19.2	8 31.1	18 44.0	+ 0 18.2	+0.7801	0.5193	0.2698	+81	− 4
α Virginis	1.2	2.68	18.7	10 42.4	**31** 2 53.8	+ 8 12.7	+0.8719	0.5204	0.2630	+79	+ 2
h Virginis	5.4	2.65	19.2	9 43.0	6 42.4	+11 54.1	−1.1510	0.5212	0.2594	−22	−90
86 Virginis	5.6	+2.59	−18.4	−11 59.4	13 0.4	− 5 59.8	−0.4036	0.5228	−0.2528	+20	−68

OCCULTATIONS VISIBLE AT WASHINGTON DURING THE YEAR 1912.

Date.	The Star's Name.	The Star's Mag.	Immersion. Washington. Sidereal Time.	Immersion. Washington. Mean Time.	Immersion. Angle from— North Point.	Immersion. Angle from— Vertex.	Emersion. Washington. Sidereal Time.	Emersion. Washington. Mean Time.	Emersion. Angle from— North Point.	Emersion. Angle from— Vertex.	Duration of Occultation.
			h m	h m	°	°	h m	h m	°	°	h m
Jan. 2	112 B. Aurigæ	5.7	10 2	15 16	136	77	10 45	15 58	229	172	0 42
4	4 Cancri	6.2	12 40	17 45	84	26	13 29	18 34	315	259	0 49
6	107 B. Leonis	6.3	12 58	17 55	106	54	13 58	18 56	320	265	1 1
22	74 Aquarii	5.8	0 20	4 17	80	58	1 28	5 24	203	169	1 7
25	88 Piscium	6.2	5 8	8 52	84	35	6 9	9 53	218	166	1 1
26	26 B. Arietis	6.0	2 39	6 20	83	63	3 51	7 31	208	169	1 11
27	π Arietis	5.2	1 19	4 55	80	117	2 32	6 8	212	218	1 13
27	45 Arietis	6.0	5 47	9 23	87	34	6 55	10 31	230	175	1 8
28	33 Tauri	6.0	8 7	11 39	84	26	9 10	12 42	255	199	1 3
28	161 B. Tauri	6.5	9 52	13 23	110	56	10 39	14 10	234	183	0 47
30	136 Tauri	4.6	1 52	5 16	59	122	2 54	6 19	275	337	1 3
30	415 B. Tauri	6.1	5 44	9 8	135	147	6 37	10 1	219	183	0 53
31	134 B. Geminorum	6.5	9 42	13 2	156	97	10 26	13 45	235	174	0 43
Feb. 4	308 B. Leonis	5.8	5 49	8 54	141	193	6 44	9 48	272	324	0 54
5	13 Virginis	5.9	14 51	17 50	89	50	15 46	18 45	342	297	0 55
10	σ Scorpii	3.1	11 55	14 35	130	174	13 2	15 42	281	317	1 7
12	C.D.–28°,14268	6.4	14 26	16 58	118	158	15 42	18 13	264	293	1 15
26	107 B. Aurigæ	6.5	6 41	8 19	83	34	8 0	9 37	273	212	1 18
27	49 Aurigæ	5.1	3 20	4 55	58	121	4 26	6 1	290	350	1 6
28	4 Cancri	6.2	13 32	15 1	94	38	14 22	15 50	305	252	0 49
Mar. 8	50 B. Scorpii	6.4	14 37	15 30	44	62	15 4	15 57	9	21	0 27
13	40 B. Capricorni †	6.2	15 53	16 27	88	135	17 9	17 43	254	292	1 16
22	τ Arietis	5.1	8 57	8 56	27	333	9 35	9 34	307	255	0 38
27	28 Cancri	6.1	7 4	6 44	116	162	8 25	8 5	283	282	1 21
27	υ′ Cancri	5.7	8 46	8 25	79	63	9 48	9 28	331	284	1 3
Apr. 4	169 B. Libræ	6.0	13 0	12 7	106	137	14 16	13 24	315	332	1 17
4	177 B. Libræ	6.2	14 13	13 20	52	69	14 44	13 52	7	18	0 32
4	42 Libræ	5.0	15 43	14 50	196	194	16 1	15 8	220	214	0 18
5	α Scorpii	1.2	12 15	11 19	150	194	13 11	12 14	260	296	0 55
5	116 B. Scorpii	6.2	13 11	12 14	128	165	14 25	13 28	282	307	1 14
11	154 B. Capricorni †	6.1	16 45	15 24	60	110	17 56	16 35	262	305	1 11
19	36 Tauri ‡	5.6	11 22	9 30	10	323	11 37	9 46	335	290	0 16
22	134 B. Geminorum	6.5	12 45	10 42	175	119	13 4	11 1	216	161	0 19
23	λ Cancri	5.9	13 6	10 58	153	94	13 49	11 42	253	197	0 44
May 2	50 B. Scorpii †	6.4	10 56	8 14	115	164	11 59	9 17	298	341	1 3
4	210 B. Scorpii	5.8	13 43	10 52	58	102	14 34	11 44	329	6	0 52
8	37 Capricorni	5.7	18 50	15 42	43	75	20 11	17 3	267	285	1 21
20	ω Cancri	5.9	13 14	9 21	35	338	13 28	9 35	5	309	0 14
20	4 Cancri	6.2	13 23	9 29	101	44	14 15	10 21	299	246	0 52
23	l Leonis	5.3	11 52	7 47	154	128	13 0	8 54	284	242	1 7
29	31 B. Scorpii	5.4	17 40	13 10	111	88	19 2	14 33	281	244	1 23
June 25	42 Libræ ‡	5.0	20 11	13 55	156	110	20 50	14 34	226	175	0 39
26	α Scorpii	1.2	17 28	11 8	70	56	18 42	12 22	316	288	1 14
26	116 B. Scorpii	6.2	18 48	12 28	72	44	20 1	13 41	303	264	1 13
28	C.D.–28°,14268 †	6.4	13 9	6 42	117	167	14 15	7 48	266	308	1 6
July 2	κ Capricorni †	4.8	16 37	9 54	24	73	17 24	10 40	302	346	0 46
9	δ Arietis	4.5	20 20	13 9	81	131	21 10	13 59	229	282	0 50
16	37 Leonis ‡	5.5	16 31	8 53	93	42	17 16	9 38	320	271	0 45

NOTE.—*The angles of position* are counted from the north point and vertex of the Moon's limb, toward the ea

† *Immersion below the hori*[illegible] *horizon of W*
‡ *Emersion below th*[illegible]

OCCULTATIONS VISIBLE AT WASHINGTON DURING THE YEAR 1912.

Date.	The Star's		Immersion.				Emersion.				Duration of Occultation.
			Washington.		Angle from—		Washington.		Angle from—		
	Name.	Mag.	Sidereal Time.	Mean Time.	North Point.	Vertex.	Sidereal Time.	Mean Time.	North Point.	Vertex.	
			h m	h m	°	°	h m	h m	°	°	h m
July 18	27 B. Virginis	6.5	16 4	8 18	203	154	16 16	8 31	226	177	0 13
27	ω Sagittarii	4.8	22 14	13 51	25	356	23 12	14 50	288	250	0 59
27	A. Sagittarii ‡	4.9	23 50	15 27	74	31	0 55	16 32	240	191	1 5
Aug. 3	ζ Piscium	5.6	20 39	11 50	13	64	21 27	12 38	279	328	0 48
4	12 H′. Arietis	6.3	21 53	12 59	36	88	22 56	14 2	254	304	1 3
8	136 Tauri	4.6	22 51	13 41	92	141	23 40	14 31	247	301	0 50
17	40 H. Virginis	5.1	18 3	8 19	154	111	18 56	9 11	253	205	0 52
19	3 Scorpii	5.9	17 56	8 4	149	123	18 57	9 4	241	206	1 0
26	29 Aquarii (*mean*)	6.5	18 51	8 31	67	104	20 16	9 56	236	259	1 25
Sept. 5	49 Aurigae	5.1	0 18	13 18	57	111	1 8	14 8	289	347	0 50
5	54 Aurigae	5.8	2 19	15 19	14	76	2 42	15 42	333	35	0 23
29	ζ Arietis	5.0	23 40	11 6	28	84	0 39	12 5	269	323	0 59
30	36 Tauri	5.6	20 47	8 9	7	124	21 37	8 59	242	294	0 50
30	χ Tauri	5.3	6 28	17 49	106	49	7 38	18 59	234	174	1 10
Oct. 1	354 B. Tauri	6.4	5 7	16 24	64	74	6 28	17 45	279	228	1 21
4	λ Cancri	5.9	1 12	12 18	154	203	1 40	12 46	218	270	0 28
4	28 Cancri	6.1	4 16	15 21	66	125	5 13	16 18	316	15	0 57
4	υ′ Cancri	5.7	5 55	17 0	40	97	6 26	17 31	353	46	0 31
13	48 B. Scorpii	4.9	18 40	5 12	123	91	19 52	6 23	259	217	1 11
24	ζ Piscium	5.6	20 57	6 45	63	114	22 5	7 53	224	270	1 8
25	12 H′. Arietis	6.3	21 45	7 29	81	134	22 45	8 28	208	258	0 59
25	19 Arietis	5.8	5 19	15 2	78	26	6 29	16 11	232	178	1 9
26	40 Arietis †	6.0	19 39	5 19	52	101	20 29	6 9	256	308	0 50
27	104 B. Tauri	5.5	22 17	7 53	11	66	22 50	8 26	299	356	0 33
29	406 B. Tauri	5.6	22 50	8 18	52	102	23 36	9 4	285	339	0 46
31	ω Cancri	5.9	0 37	9 57	64	111	1 22	10 42	304	355	0 45
31	4 Cancri	6.2	0 58	10 17	129	179	1 41	11 0	239	292	0 43
Nov. 2	107 B. Leonis	6.3	4 52	14 3	49	103	5 21	14 32	354	48	0 29
15	φ Capricorni ‡	5.3	1 34	9 54	3	317	2 10	10 30	296	247	0 36
20	171 B. Piscium	6.3	2 39	10 40	45	12	3 57	11 57	241	196	1 17
23	τ Arietis	5.1	20 39	4 29	54	104	21 30	5 20	256	311	0 51
23	104 B. Tauri ‡	5.5	10 44	18 32	80	31	11 35	19 22	263	220	0 50
25	107 B. Aurigae	6.5	2 37	10 18	135	197	3 16	10 57	198	258	0 39
25	406 B. Tauri	5.6	10 12	17 52	95	34	11 11	18 51	278	221	0 59
26	49 Aurigae	5.1	0 22	7 59	19	73	0 45	8 23	328	24	0 24
27	*c* Geminorum	5.5	2 5	9 38	149	205	2 37	10 10	216	273	0 32
27	ω Cancri	5.9	10 41	18 13	38	339	10 58	18 29	9	309	0 16
27	4 Cancri	6.2	10 52	18 24	100	41	11 56	19 28	306	247	1 4
Dec. 11	A. Sagittarii	4.9	21 8	3 47	45	29	22 26	5 5	267	237	1 18
14	182 B. Aquarii	6.2	2 31	8 58	60	15	3 36	10 2	233	183	1 4
19	19 Arietis	5.8	3 5	9 12	99	73	4 7	10 14	197	155	1 2
20	ζ Arietis	5.0	8 42	14 44	125	70	9 22	15 23	210	158	0 39
23	415 B. Tauri	6.1	22 58	4 50	123	173	23 35	5 27	218	271	0 37
24	47 Geminorum	5.6	0 21	6 9	108	158	1 10	6 58	249	304	0 49
24	134 B. Geminorum	6.5	2 50	8 37	166	226	3 5	8 52	194	254	0 15
25	λ Cancri	5.9	1 59	7 42	78	131	2 51	8 34	296	353	0 52
28	σ Leonis	4.1	7 5	12 36	88	139	8 1	13 31	337	23	0 55
30	*g* Virginis	5.6	12 54	18 16	129	132	14 13	19 35	311	294	1 19

NOTE.—The angles of position are counted from the north point and vertex of the Moon's limb toward the east.

† *Immersion* below the horizon of Washington.
‡ *Emersion* below the horizon of Washington.

ILLUMINATED DISK OF MERCURY, 1912.

FOR WASHINGTON MEAN NOON.

Date.		k	i	θ	L	Stellar mag.	Date.		k	i	θ	L	Stellar mag.
			°	°						°	°		
Jan.	1	0.180	130	194	33.1	+1.0	July	4	0.778	56	7	42.1	-0.4
	6	0.373	105	190	46.3	0.4		9	0.697	67	12	37.3	0.0
	11	0.534	86	186	45.1	+0.1		14	0.622	76	16	34.5	+0.2
	16	0.651	73	182	39.7	0.0		19	0.548	85	19	32.8	0.4
	21	0.735	62	178	34.5	0.0		24	0.473	93	22	31.8	0.6
	26	0.801	53	173	30.8	-0.1		29	0.392	103	25	30.9	+0.8
	31	0.845	46	169	28.1	0.1	Aug.	3	0.304	113	28	30.3	1.0
Feb.	5	0.883	40	164	26.9	0.2		8	0.206	126	32	24.3	1.4
	10	0.915	34	159	26.8	0.3		13	0.108	142	39	15.8	1.9
	15	0.943	28	154	27.7	0.5		18	0.032	159	56	5.6	2.5
	20	0.967	21	147	30.1	-0.7		23	0.012	167	140	2.2	+2.8
	25	0.987	13	136	34.2	1.0		28	0.078	148	184	14.1	1.9
Mar.	1	0.998	5	91	40.6	1.3	Sept.	2	0.229	123	195	37.2	+0.9
	6	0.990	11	357	49.5	1.4		7	0.439	97	200	59.0	0.0
	11	0.945	27	341	60.5	1.3		12	0.659	72	205	69.0	-0.6
	16	0.842	47	336	69.6	-1.1		17	0.829	49	210	65.1	-1.0
	21	0.675	70	332	70.2	0.6		22	0.933	30	214	54.7	1.2
	26	0.474	93	331	59.4	-0.1		27	0.983	15	222	44.2	1.2
	31	0.283	116	330	41.4	+0.7	Oct.	2	0.998	5	251	36.5	1.2
Apr.	5	0.130	138	326	21.8	1.5		7	0.997	6	4	31.0	1.0
	10	0.033	159	318	6.2	+2.4		12	0.987	13	18	27.7	-0.8
	15	0.002	176	239	0.3	3.3		17	0.969	20	22	25.9	0.6
	20	0.030	160	161	5.0	2.6		22	0.948	26	22	25.3	0.4
	25	0.099	143	155	14.5	1.9		27	0.922	33	21	25.7	0.3
	30	0.185	129	153	22.7	1.4	Nov.	1	0.888	39	20	27.4	0.2
May	5	0.276	117	152	28.0	+1.1		6	0.844	46	18	30.5	-0.2
	10	0.363	106	152	31.4	0.8		11	0.785	55	15	35.0	0.2
	15	0.447	96	153	33.9	0.6		16	0.700	67	12	41.3	-0.1
	20	0.534	86	154	36.8	+0.3		21	0.576	81	10	48.1	0.0
	25	0.625	76	156	40.8	0.0		26	0.405	101	8	50.5	+0.2
	30	0.724	63	159	46.5	-0.4	Dec.	1	0.192	128	5	36.1	+0.9
June	4	0.829	49	163	54.2	0.8		6	0.000	179	356	0.2	2.3
	9	0.926	31	170	62.4	1.3		11	0.035	158	206	8.6	2.1
	14	0.989	12	185	67.2	1.7		16	0.219	124	199	39.5	0.8
	19	0.993	10	335	65.1	1.7		21	0.429	98	196	51.4	+0.2
	24	0.941	28	354	57.5	-1.3		26	0.595	79	193	47.8	-0.1
	29	0.863	44	1	48.9	-0.8		31	0.710	65	189	40.7	-0.2

NOTATION.

k=the ratio of the area of the illuminated portion of the apparent disk to the area of the entire apparent disk regarded as circular.

i=the angle between the Sun and Earth, as seen from the planet.

θ=the angle which the line joining the cusps, or extremities of the illuminated portion, makes with the meridian.

L=the brilliancy of the disk. The unit of L is the amount of light received by an eye from a circular disk with the same albedo as the planet, subtending an angular radius of one second of arc, situated at distance unity from the Sun, and illuminated by the latter as the mean disk of the planet is illuminated.

ILLUMINATED DISK OF VENUS, 1912.

FOR WASHINGTON MEAN NOON.

Date.	k	i	θ	L	Stellar mag.	Date.	k	i	θ	L	Stellar mag.
		°	°					°	°		
Jan. 1	0.667	70.5	196.0	103.8	−3.7	July 4	1.000	1.0	242.6	46.9	−3.5
6	0.686	68.2	193.9	99.0	3.7	9	1.000	1.8	329.7	47.0	3.5
11	0.704	66.0	191.6	94.6	3.7	14	0.999	3.6	348.7	47.1	3.5
16	0.721	63.9	189.1	90.5	3.6	19	0.998	5.5	356.5	47.2	3.5
21	0.737	61.8	186.4	86.7	3.6	24	0.996	7.4	1.5	47.4	3.4
26	0.752	59.8	183.7	83.2	−3.6	29	0.993	9.4	5.3	47.6	−3.4
31	0.767	57.8	180.9	80.0	3.5	Aug. 3	0.990	11.4	8.4	47.9	3.4
Feb. 5	0.781	55.8	178.1	77.0	3.5	8	0.987	13.3	11.1	48.2	3.4
10	0.795	53.9	175.1	74.2	3.5	13	0.983	15.2	13.3	48.6	3.4
15	0.808	52.0	172.3	71.7	3.5	18	0.978	17.2	15.2	49.0	3.4
20	0.820	50.2	169.6	69.3	−3.4	23	0.973	19.1	16.8	49.5	−3.4
25	0.832	48.4	166.9	67.1	3.4	28	0.967	21.0	18.0	50.0	3.4
Mar. 1	0.844	46.5	164.5	65.1	3.4	Sept. 2	0.961	22.8	19.0	50.5	3.3
6	0.855	44.7	162.2	63.2	3.4	7	0.954	24.7	19.8	51.1	3.3
11	0.866	42.9	160.2	61.5	3.4	12	0.947	26.5	20.4	51.8	3.3
16	0.877	41.1	158.4	59.9	−3.4	17	0.940	28.4	20.6	52.5	−3.3
21	0.887	39.4	156.8	58.4	3.3	22	0.932	30.2	20.4	53.3	3.3
26	0.896	37.6	155.4	57.1	3.3	27	0.924	32.0	20.0	54.2	3.3
31	0.905	35.8	154.3	55.9	3.3	Oct. 2	0.916	33.8	19.4	55.2	3.3
Apr. 5	0.914	34.1	153.5	54.7	3.3	7	0.907	35.6	18.6	56.2	3.3
10	0.923	32.3	153.0	53.6	−3.3	12	0.898	37.4	17.4	57.3	−3.3
15	0.931	30.5	152.7	52.7	3.3	17	0.888	39.1	16.0	58.5	3.4
20	0.939	28.7	152.7	51.9	3.3	22	0.878	40.9	14.4	59.8	3.4
25	0.946	26.9	153.0	51.1	3.3	27	0.868	42.7	12.5	61.3	3.4
30	0.953	25.1	153.5	50.4	3.3	Nov. 1	0.857	44.4	10.4	62.8	3.4
May 5	0.959	23.3	154.4	49.8	−3.3	6	0.846	46.2	8.2	64.5	−3.4
10	0.965	21.5	155.5	49.2	3.3	11	0.835	48.0	5.8	66.3	3.4
15	0.971	19.6	156.9	48.7	3.3	16	0.823	49.7	3.3	68.3	3.4
20	0.977	17.6	158.6	48.3	3.3	21	0.811	51.5	0.7	70.5	3.4
25	0.982	15.7	160.7	47.9	3.4	26	0.798	53.4	358.1	72.9	3.5
30	0.986	13.9	163.2	47.6	−3.4	Dec. 1	0.785	55.2	355.6	75.4	−3.5
June 4	0.989	12.1	166.0	47.4	3.4	6	0.772	57.1	353.1	78.2	3.5
9	0.992	10.2	169.1	47.2	3.4	11	0.758	59.0	350.7	81.2	3.6
14	0.995	8.3	172.9	47.0	3.4	16	0.743	61.0	348.5	84.4	3.6
19	0.997	6.4	177.6	46.9	3.4	21	0.727	63.0	346.4	87.9	3.6
24	0.999	4.5	184.0	46.9	−3.5	26	0.711	65.0	344.5	91.7	−3.6
29	1.000	2.7	196.0	46.9	−3.5	31	0.695	67.1	342.8	95.8	−3.7

NOTATION.

k = the ratio of the area of the illuminated portion of the apparent disk to the area of the entire apparent disk regarded as circular.

i = the angle between the Sun and Earth, as seen from the planet.

θ = the angle which the line joining the cusps, or extremities of the illuminated portion, makes with the meridian.

L = the brilliancy of the disk. The unit of L is the amount of light received by an eye from a circular disk with the same albedo as the planet, subtending an angular radius of one second of arc, situated at distance unity from the Sun, and illuminated by the latter as the mean disk of the planet is illuminated.

APPARENT DISK AND STELLAR MAGNITUDE OF MARS, 1912.

	k	Stellar Mag.*		k	Stellar Mag.*
January 1	0.946	−0.7	July 29	0.973	+2.0
January 31	0.906	+0.1	August 28	0.987	2.0
March 1	0.896	0.8	September 27	0.996	1.9
March 31	0.904	1.3	October 27	0.999	1.7
April 30	0.919	1.6	November 26	0.997	1.7
May 30	0.938	1.8	December 26	0.992	+1.6
June 29	0.956	+1.9			

Mars not being in opposition during the year 1912, the satellites will not be visible.

STELLAR MAGNITUDES OF JUPITER AND SATURN,* 1912.

Date.	Jupiter.	Saturn.	Date.	Jupiter.	Saturn.	Date.	Jupiter.	Saturn.
Jan. 1	−1.3	+0.3	May 10	−2.1	+0.3	Sept. 17	−1.6	+0.2
11	1.4	0.3	20	2.1	0.3	27	1.6	0.1
21	1.4	0.4	30	2.1	0.4	Oct. 7	1.5	+0.1
31	1.5	0.4	June 9	2.1	0.4	17	1.5	0.0
Feb. 10	1.5	0.4	19	2.1	0.4	27	1.4	0.0
20	−1.6	+0.5	29	−2.1	+0.4	Nov. 6	−1.4	−0.1
Mar. 1	1.7	0.5	July 9	2.0	0.4	16	1.4	0.2
11	1.7	0.5	19	2.0	0.4	26	1.4	0.2
21	1.8	0.5	29	1.9	0.4	Dec. 6	1.4	0.1
31	1.9	0.5	Aug. 8	1.9	0.4	16	1.4	−0.1
Apr. 10	−1.9	+0.4	18	−1.8	+0.3	26	−1.4	0.0
20	2.0	0.4	28	1.7	0.3	36	−1.4	+0.1
30	−2.0	+0.4	Sept. 7	−1.7	+0.2			

At opposition, the stellar magnitude of Uranus is 6.0, of Neptune 7.6.

k = the ratio of the area of the illuminated portion of the apparent disk to the area of the entire apparent disk regarded as circular.

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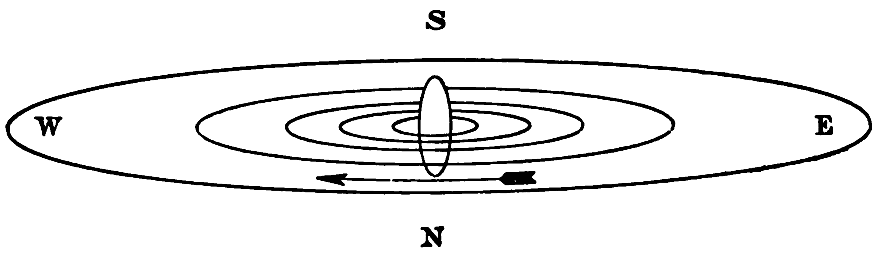
* These values of the magnitudes of the planets have been computed from formulæ given in the Potsdam Observations, vol. 8, page 366.



APPARENT ORBITS OF THE SATELLITES OF JUPITER AT DATE OF OPPOSITION, JUNE 1, 1912, AS SEEN IN AN INVERTING TELESCOPE.

(*The vertical scale is three times the horizontal one.*)

In the above diagram the central vertical ellipse represents the disk of Jupiter, elongated three times in the vertical direction, and the inner ellipse represents the orbit of Satellite V. The object of the figure is to facilitate the identification of satellites in cases where the diagrams of configurations do not suffice. For example, if two satellites are seen together, a reference to the above figure will show which is the inner and which the outer one of the pair.

The ephemeris of the four outer satellites of Jupiter is given on pages 614-635, each month occupying two pages, which contain, respectively, the times of the phenomena and the diagrams of the configurations. The latter are given for each day, Jupiter being represented by a light disk, ○, in the center of the page, and the relative positions of the satellites at the Washington time stated above the diagrams being indicated by dots. The designation of each satellite is shown by a numeral placed to the right or left of the dot, according as the motion of the satellite at the instant in question is toward the east or toward the west, the motion being always toward the numeral. In constructing the diagrams the latitudes of the satellites are always considered zero, except where two or more of them chance to be at nearly the same distance from the planet, when they are placed one above the other, according to their apparent latitudes. If, at the epoch of any configuration, one or more satellites are projected on the disk of the planet, that phenomenon is indicated by a light disk, ○, at the left-hand side of the page; and if any satellites are invisible on account of being occulted behind the disk of the planet, or eclipsed by its shadow, that circumstance is indicated by a dark disk, ●, at the right-hand side of the page. In both cases the annexed numerals serve to point out which satellites are thus rendered invisible.

The differential coordinates of the sixth and seventh satellites will be found on page 613.

MEAN SYNODIC PERIODS OF THE SATELLITES.

	d	h	m	s		d		d	h	m	s		d
I.	1	18	28	35.945	=	1.769 860 48	V.	0	11	57	27.635	=	0.498 236 52
II.	3	13	17	53.735	=	3.554 094 16	VI.					=	266.00
III.	7	3	59	35.854	=	7.166 387 20	VII.					=	260.06
IV.	16	18	5	6.928	=	16.753 552 41							

SATELLITE V.

WASHINGTON MEAN TIME OF EVERY TWENTIETH GREATEST ELONGATION.

	d	h			d	h			d	h			d	h	
Mar.	0	11.8	E.	May	29	15.7	E.	Mar.	0	17.8	W.	May	29	9.7	W.
	10	11.0	E.	June	8	14.8	E.		10	16.9	W.	June	8	8.8	W.
	20	10.1	E.		18	13.9	E.		20	16.1	W.		18	7.9	W.
	30	9.2	E.		28	13.0	E.		30	15.2	W.		28	7.0	W.
Apr.	9	8.3	E.	July	8	12.1	E.	Apr.	9	14.3	W.	July	8	6.1	W.
	19	7.4	E.		18	11.2	E.		19	13.4	W.		18	17.2	W.
	29	6.5	E.		28	10.3	E.		29	12.4	W.		28	16.3	W.
May	9	17.5	E.	Aug.	7	9.4	E.	May	9	11.5	W.	Aug.	7	15.4	W.
	19	16.6	E.		17	8.6	E.		19	10.6	W.		17	14.6	W.

WASHINGTON MEAN TIME OF SUPERIOR GEOCENTRIC CONJUNCTION.

SATELLITE I.

	d	h	m		d	h	m		d	h	m		d	h	m
Jan.	2	5	55.3	Mar.	23	16	9.5	June	13	0	26.7	Sept.	2	9	24.7
	4	0	25.3		25	10	37.2		14	18	52.8		4	3	53.6
	5	18	55.2		27	5	4.8		16	13	18.8		5	22	22.5
	7	13	25.1		28	23	32.3		18	7	44.9		7	16	51.5
	9	7	55.0		30	17	59.7		20	2	11.0		9	11	20.6
	11	2	24.9	Apr.	1	12	27.1		21	20	37.2		11	5	49.7
	12	20	54.7		3	6	54.4		23	15	3.5		13	0	18.9
	14	15	24.5		5	1	21.6		25	9	29.8		14	18	48.1
	16	9	54.2		6	19	48.8		27	3	56.1		16	13	17.4
	18	4	24.0		8	14	15.9		28	22	22.5		18	7	46.7
	19	22	53.7		10	8	43.0		30	16	48.9		20	2	16.0
	21	17	23.4		12	3	10.0	July	2	11	15.3		21	20	45.4
	23	11	53.0		13	21	36.9		4	5	41.8		23	15	14.9
	25	6	22.5		15	16	3.7		6	0	8.4		25	9	44.4
	27	0	52.0		17	10	30.4		7	18	35.2		27	4	13.9
	28	19	21.6		19	4	57.2		9	13	2.0		28	22	43.5
	30	13	51.0		20	23	23.8		11	7	28.8		30	17	13.1
Feb.	1	8	20.5		22	17	50.4		13	1	55.6	Oct.	2	11	42.8
	3	2	49.9		24	12	17.0		14	20	22.5		4	6	12.5
	4	21	19.2		26	6	43.5		16	14	49.5		6	0	42.2
	6	15	48.5		28	1	9.9		18	9	16.6		7	19	12.0
	8	10	17.7		29	19	36.3		20	3	43.7		9	13	41.8
	10	4	46.8	May	1	14	2.6		21	22	10.9		11	8	11.6
	11	23	15.9		3	8	28.9		23	16	38.2		13	2	41.5
	13	17	45.0		5	2	55.1		25	11	5.6		14	21	11.4
	15	12	14.0		6	21	21.3		27	5	33.0		16	15	41.4
	17	6	42.9		8	15	47.4		29	0	0.5		18	10	11.4
	19	1	11.8		10	10	13.5		30	18	28.1		20	4	41.4
	20	19	40.7		12	4	39.6	Aug.	1	12	55.7		21	23	11.5
	22	14	9 5		13	23	5.7		3	7	23.4		23	17	41.6
	24	8	38.2		15	17	31.7		5	1	51.2		25	12	11.7
	26	3	6.9		17	11	57.7		6	20	19.0		27	6	41.8
	27	21	35.5		19	6	23.6		8	14	46.9		29	1	11.9
	29	16	4.1		21	0	49.6		10	9	14.9		30	19	42.1
Mar.	2	10	32.6		22	19	15.5		12	3	42.9	Nov.	1	14	12.3
	4	5	1.0		24	13	41.4		13	22	11.0		3	8	42.5
	5	23	29.4		26	8	7.3		15	16	39.2		5	3	12.7
	7	17	57.7		28	2	33.2		17	11	7.5		6	21	43.0
	9	12	25.9		29	20	59.1		19	5	35.8		8	16	13.3
	11	6	54.1		31	15	25.0		21	0	4.2		10	10	43.6
	13	1	22.2	June	2	9	50.9		22	18	32.7		12	5	13.9
	14	19	50.3		4	4	16.8		24	13	1.2		13	23	44.2
	16	14	18.3		5	22	42.7		26	7	29.8		15	18	14.6
	18	8	46.2		7	17	8.7		28	1	58.5		17	12	44.9
	20	3	14.0		9	11	34.7		29	20	27.2		19	7	15.3
	21	21	41.8		11	6	0.7		31	14	55.9		21	1	45.

WASHINGTON MEAN TIME OF SUPERIOR GEOCENTRIC CONJUNCTION.

SATELLITE II.

	d	h	m		d	h	m		d	h	m		d	h
Jan.	1	9	48.0	Mar.	23	4	9.7	June	12	18	53.8	Sept.	2	11
	4	23	10.6		26	17	23.9		16	8	2.6		6	0
	8	12	32.8		30	6	37.7		19	21	10.6		9	13
	12	1	54.9	Apr.	2	19	50.8		23	10	20.0		13	3
	15	15	17.0		6	9	3.5		26	23	28.7		16	16
	19	4	38.7		9	22	15.5		30	12	38.8		20	5
	22	18	0.3		13	11	27.2	July	4	1	48.5		23	19
	26	7	21.4		17	0	38.3		7	14	59.5		27	8
	29	20	42.3		20	13	49.2		11	4	9.9		30	21
Feb.	2	10	2.8		24	2	59.3		14	17	21.8	Oct.	4	11
	5	23	23.1		27	16	9.2		18	6	33.4		8	0
	9	12	42.8	May	1	5	18.3		21	19	46.6		11	14
	13	2	2.3		4	18	27.6		25	8	59.4		15	3
	16	15	21.4		8	7	35.9		28	22	13.8		18	16
	20	4	40.3		11	20	44.6	Aug.	1	11	27.8		22	6
	23	17	58.8		15	9	52.4		5	0	43.5		25	19
	27	7	16.7		18	23	0.6		8	13	58.5		29	9
Mar.	1	20	34.3		22	12	8.0		12	3	15.4	Nov.	1	22
	5	9	51.4		26	1	15.9		15	16	31.5		5	11
	8	23	8.0		29	14	23.1		19	5	49.3		9	1
	12	12	24.2	June	2	3	31.0		22	19	6.6		12	14
	16	1	39.8		5	16	38.2		26	8	25.4		16	4
	19	14	55.0		9	5	46.4		29	21	43.7		19	17

SATELLITE III.

	d	h	m		d	h	m		d	h	m		d	h
Jan.	5	2	25.3	Apr.	7	7	11.4	July	9	3	6.5	Oct.	10	6
	12	6	47.2		14	10	46.8		16	6	36.8		17	10
	19	11	7.5		21	14	18.0		23	10	12.1		24	14
	26	15	24.9		28	17	45.5		30	13	51.5		31	19
Feb.	2	19	39.9	May	5	21	9.1	Aug.	6	17	36.0	Nov.	7	23
	9	23	51.6		13	0	29.8		13	21	24.6		15	4
	17	4	0.1		20	3	47.6		21	1	17.3		22	8
	24	8	5.5		27	7	4.4		28	5	14.1			
Mar.	2	12	7.0	June	3	10	20.9	Sept.	4	9	15.0			
	9	16	5.2		10	13	37.7		11	13	20.2			
	16	19	58.6		17	16	56.6		18	17	28.7			
	23	23	47.6		24	20	16.9		25	21	40.9			
	31	3	31.8	July	1	23	40.2	Oct.	3	1	55.5			

SATELLITE IV.

	d	h	m		d	h	m		d	h	m		d	h
Jan.	7	14	13.2	Apr.	17	3	9.0	July	25	20	4.4	Nov.	3	11
	24	10	7.0	May	3	18	19.1	Aug.	11	12	42.7		20	8
Feb.	10	5	29.4		20	8	50.1		28	6	17.2			
	27	0	12.4	June	5	23	4.[illegible]	Sept.	14	0	42.1			
Mar.	14	18	6.3		22	13	26.3		30	19	49.8			
	31	11	5.9	July	9	4	21.2	Oct.	17	15	33.1			

SIXTH SATELLITE OF JUPITER.

DIFFERENTIAL COORDINATES OF JUPITER'S SIXTH SATELLITE 1912.

ashington ean Noon.		$\alpha_{VI}-\alpha_{Jup.}$		$\delta_{VI}-\delta_{Jup.}$	Washington Mean Noon.		$\alpha_{VI}-\alpha_{Jup.}$		$\delta_{VI}-\delta_{Jup.}$	Washington Mean Noon.		$\alpha_{VI}-\alpha_{Jup.}$		$\delta_{VI}-\delta_{Jup.}$
		m	s	′			m	s	′			m	s	′
ı.	1	+2	1	−16.1	May	5	−4	23	+ 3.0	Sept.	7	+2	26	−19.2
	6	1	50	17.8		10	4	16	6.4		12	2	10	20.7
	11	1	38	19.3		15	4	5	9.7		17	1	52	22.0
	16	1	24	20.6		20	3	49	12.8		22	1	34	23.1
	21	1	10	21.9		25	3	28	15.7		27	1	16	23.8
	26	0	55	23.0		30	3	2	18.2	Oct.	2	0	58	24.4
	31	0	39	24.1	June	4	2	31	20.2		7	0	40	24.8
b.	5	0	22	25.0		9	1	55	21.7		12	0	23	25.0
	10	+0	4	25.5		14	1	17	22.5		17	+0	7	25.0
	15	−0	15	25.8		19	−0	37	22.7		22	−0	10	24.8
	20	0	35	26.0		24	+0	3	22.1		27	0	26	24.4
	25	0	55	25.9		29	0	42	20.9	Nov.	1	0	42	23.8
ırch	1	1	15	25.5	July	4	1	19	19.1		6	0	57	23.1
	6	1	36	24.8		9	1	53	16.7		11	1	11	22.2
	11	1	57	23.9		14	2	21	13.8		16	1	25	21.2
	16	2	18	22.7		19	2	45	10.4		21	1	38	19.9
	21	2	38	21.2		24	3	3	6.9		26	1	49	18.6
	26	2	57	19.4		29	3	15	+ 3.3	Dec.	1	2	1	17.3
	31	3	16	17.4	Aug.	3	3	22	− 0.3		6	2	11	15.8
ril	5	3	34	15.1		8	3	24	3.8		11	2	21	14.2
	10	3	51	12.5		13	3	22	7.1		16	2	30	12.6
	15	4	3	9.6		18	3	16	10.2		21	2	38	10.8
	20	4	13	6.6		23	3	7	13.0		26	2	45	9.0
	25	4	21	3.5		28	2	55	15.4		31	−2	51	− 7.2
	30	−4	25	− 0.3	Sept.	2	+2	41	−17.5					

SEVENTH SATELLITE OF JUPITER.

DIFFERENTIAL COORDINATES OF JUPITER'S SEVENTH SATELLITE 1912.

ıshington an Noon.		$\alpha_{VII}-\alpha_{Jup.}$		$\delta_{VII}-\delta_{Jup.}$	Washington Mean Noon.		$\alpha_{VII}-\alpha_{Jup.}$		$\delta_{VII}-\delta_{Jup.}$	Washington Mean Noon.		$\alpha_{VII}-\alpha_{Jup.}$		$\delta_{VII}-\delta_{Jup.}$
		m	s	′			m	s	′			m	s	′
ı.	1	+3	2	+14.7	May	5	−1	30	−13.2	Sept.	7	+2	55	+16.4
	6	3	12	15.6		10	2	3	14.6		12	3	6	17.4
	11	3	20	16.4		15	2	32	15.5		17	3	16	18.3
	16	3	27	17.1		20	2	56	16.0		22	3	23	18.9
	21	3	34	17.6		25	3	12	15.9		27	3	29	19.2
	26	3	40	17.9		30	3	22	15.3	Oct.	2	3	34	19.3
	31	3	44	18.1	June	4	3	26	14.3		7	3	37	19.3
ɔ.	5	3	47	18.1		9	3	23	12.8		12	3	39	19.2
	10	3	49	18.0		14	3	12	11.0		17	3	39	19.1
	15	3	50	17.7		19	2	57	8.9		22	3	38	18.8
	20	3	50	17.3		24	2	37	6.7		27	3	37	18.3
	25	3	48	16.6		29	2	12	4.4	Nov.	1	3	34	17.7
rch	1	3	43	15.6	July	4	1	46	− 2.1		6	3	30	17.0
	6	3	36	14.3		9	1	19	+ 0.2		11	3	25	16.2
	11	3	27	12.8		14	0	51	2.3		16	3	19	15.2
	16	3	14	11.0		19	−0	24	4.2		21	3	12	14.0
	21	2	59	8.9		24	+0	2	5.9		26	3	4	12.7
	26	2	40	6.6		29	0	27	7.3	Dec.	1	2	54	11.2
	31	2	18	4.1	Aug.	3	0	51	8.5		6	2	43	9.4
ril	5	1	52	+ 1.4		8	1	13	9.7		11	2	30	7.5
	10	1	23	− 1.3		13	1	34	10.8		16	2	16	5.3
	15	0	51	4.0		18	1	54	11.9		21	2	0	2.9
	20	+0	17	6.7		23	2	12	13.0		26	1	43	+ 0.3
	25	−0	19	9.2		28	2	28	14.1		31	+1	24	− 2.5
	30	−0	55	−11.4	Sept.	2	+2	42	+15.3					

JUPITER'S SATELLITES, 1912.

WASHINGTON MEAN TIME.

JANUARY.

d	h	m	s			
1	6	50		I.	Sh.	In.
	7	6	56	II.	Ec.	Dis.
	7	33		I.	Tr.	In.
	8	17		III.	Sh.	In.
	9	3		I.	Sh.	Eg.
	9	46		I.	Tr.	Eg.
	10	5		III.	Sh.	Eg.
	11	7		II.	Oc.	Re.
	11	8		III.	Tr.	In.
	13	6		III.	Tr.	Eg.
2	4	7	2	I.	Ec.	Dis.
	7	2		I.	Oc.	Re.
3	1	19		I.	Sh.	In.
	1	44		II.	Sh.	In.
	2	3		I.	Tr.	In.
	3	15		II.	Tr.	In.
	3	31		I.	Sh.	Eg.
	4	16		I.	Tr.	Eg.
	4	21		II.	Sh.	Eg.
	5	54		II.	Tr.	Eg.
	22	35	34	I.	Ec.	Dis.
4	1	32		I.	Oc.	Re.
	19	47		I.	Sh.	In.
	20	23	29	II.	Ec.	Dis.
	20	33		I.	Tr.	In.
	21	59		I.	Sh.	Eg.
	22	31	8	III.	Ec.	Dis.
	22	46		I.	Tr.	Eg.
5	0	3	19	III.	Ec.	Re.
	0	30		II.	Oc.	Re.
	1	28		III.	Oc.	Dis.
	3	25		III.	Oc.	Re.
	17	3	57	I.*	Ec.	Dis.
	20	1		I.	Oc.	Re.
6	14	15		I.	Sh.	In.
	15	2		II.	Sh.	In.
	15	2		I.	Tr.	In.
	16	28		I.	Sh.	Eg.
	16	39		II.	Tr.	In.
	17	16		I.*	Tr.	Eg.
	17	40		II.*	Sh.	Eg.
	19	18		II.	Tr.	Eg.
7	11	32	28	I.	Ec.	Dis.
	14	31		I.	Oc.	Re.
8	8	44		I.	Sh.	In.
	9	32		I.	Tr.	In.
	9	40	1	II.	Ec.	Dis.
	10	56		I.	Sh.	Eg.
	11	45		I.	Tr.	Eg.
	12	15		III.	Sh.	In.
	13	52		II.	Oc.	Re.
	14	3		III.	Sh.	Eg.
	15	30		III.	Tr.	In.
	17	28		III.*	Tr.	Eg.
9	6	0	53	I.	Ec.	Dis.
	9	1		I.	Oc.	Re.
10	3	12		I.	Sh.	In.
	4	2		I.	Tr.	In.
	4	20		II.	Sh.	In.
	5	24		I.	Sh.	Eg.
	6	3		II.	Tr.	In.
	6	15		I.	Tr.	Eg.
	6	58		II.	Sh.	Eg.
	8	42		II.	Tr.	Eg.
11	0	29	24	I.	Ec.	Dis.
	3	31		I.	Oc.	Re.

d	h	m	s			
11	21	40		I.	Sh.	In.
	22	32		I.	Tr.	In.
	22	56	32	II.	Ec.	Dis.
	23	53		I.	Sh.	Eg.
12	0	45		I.	Tr.	Eg.
	2	28	49	III.	Ec.	Dis.
	3	14		II.	Oc.	Re.
	4	1	58	III.	Ec.	Re.
	5	48		III.	Oc.	Dis.
	7	46		III.	Oc.	Re.
	18	57	46	I.	Ec.	Dis.
	22	1		I.	Oc.	Re.
13	16	8		I.	Sh.	In.
	17	1		I.*	Tr.	In.
	17	38		II.*	Sh.	In.
	18	21		I.*	Sh.	Eg.
	19	14		I.	Tr.	Eg.
	19	27		II.	Tr.	In.
	20	16		II.	Sh.	Eg.
	22	6		II.	Tr.	Eg.
14	13	26	16	I.	Ec.	Dis.
	16	31		I.*	Oc.	Re.
15	10	37		I.	Sh.	In.
	11	31		I.	Tr.	In.
	12	13	3	II.	Ec.	Dis.
	12	49		I.	Sh.	Eg.
	13	44		I.	Tr.	Eg.
	16	12		III.	Sh.	In.
	16	36		II.*	Oc.	Re.
	18	1		III.*	Sh.	Eg.
	19	50		III.	Tr.	In.
	21	48		III.	Tr.	Eg.
16	7	54	40	I.	Ec.	Dis.
	11	0		I.	Oc.	Re.
17	5	5		I.	Sh.	In.
	6	1		I.	Tr.	In.
	6	56		II.	Sh.	In.
	7	18		I.	Sh.	Eg.
	8	14		I.	Tr.	Eg.
	8	50		II.	Tr.	In.
	9	34		II.	Sh.	Eg.
	11	29		II.	Tr.	Eg.
18	2	23	9	I.	Ec.	Dis.
	5	30		I.	Oc.	Re.
	23	33		I.	Sh.	In.
19	0	30		I.	Tr.	In.
	1	29	32	II.	Ec.	Dis.
	1	46		I.	Sh.	Eg.
	2	43		I.	Tr.	Eg.
	5	58		II.	Oc.	Re.
	6	27	1	III.	Ec.	Dis.
	8	1	12	III.	Ec.	Re.
	10	9		III.	Oc.	Dis.
	12	6		III.	Oc.	Re.
	20	51	30	I.	Ec.	Dis.
20	0	0		I.	Oc.	Re.
	18	2		I.*	Sh.	In.
	19	0		I.	Tr.	In.
	20	14		I.	Sh.	Eg.
	20	14		II.	Sh.	In.
	21	13		I.	Tr.	Eg.
	22	14		II.	Tr.	In.
	22	52		II.	Sh.	Eg.
21	0	52		II.	Tr.	Eg.
	15	19	59	I.	Ec.	Dis.

d	h	m	s			
21	18	30		I.*	Oc.	Re.
22	12	30		I.	Sh.	In.
	13	29		I.	Tr.	In.
	14	42		I.	Sh.	Eg.
	14	46	3	II.	Ec.	Dis.
	15	42		I.	Tr.	Eg.
	19	20		II.	Oc.	Re.
	20	8		III.	Sh.	In.
	21	59		III.	Sh.	Eg.
23	0	8		III.	Tr.	In.
	2	5		III.	Tr.	Eg.
	9	48	22	I.	Ec.	Dis.
	12	59		I.	Oc.	Re.
24	6	58		I.	Sh.	In.
	7	58		I.	Tr.	In.
	9	11		I.	Sh.	Eg.
	9	32		II.	Sh.	In.
	10	12		I.	Tr.	Eg.
	11	36		II.	Tr.	In.
	12	10		II.	Sh.	Eg.
	14	14		II.	Tr.	Eg.
25	4	16	50	I.	Ec.	Dis.
	7	29		I.	Oc.	Re.
26	1	26		I.	Sh.	In.
	2	28		I.	Tr.	In.
	3	39		I.	Sh.	Eg.
	4	2	32	II.	Ec.	Dis.
	4	41		I.	Tr.	Eg.
	8	41		II.	Oc.	Re.
	10	24	34	III.	Ec.	Dis.
	11	59	48	III.	Ec.	Re.
	14	26		III.	Oc.	Dis.
	16	23		III.*	Oc.	Re.
	22	45	11	I.	Ec.	Dis.
27	1	58		I.	Oc.	Re.
	19	55		I.	Sh.	In.
	20	57		I.	Tr.	In.
	22	7		I.	Sh.	Eg.
	22	50		II.	Sh.	In.
	23	10		I.	Tr.	Eg.
28	0	59		II.	Tr.	In.
	1	28		II.	Sh.	Eg.
	3	37		II.	Tr.	Eg.
	17	13	39	I.*	Ec.	Dis.
	20	28		I.	Oc.	Re.
29	14	23		I.	Sh	In.
	15	27		I.	Tr.	In.
	16	36		I.*	Sh.	Eg.
	17	19	3	II.*	Ec.	Dis.
	17	40		I.*	Tr.	Eg.
	22	2		II.	Oc.	Re.
30	0	6		III.	Sh.	In.
	1	57		III.	Sh.	Eg.
	4	24		III.	Tr.	In.
	6	21		III.	Tr.	Eg.
	11	42	1	I.	Ec.	Dis.
	14	57		I.	Oc.	Re.
31	8	51		I.	Sh.	In.
	9	56		I.	Tr.	In.
	11	4		I.	Sh.	Eg.
	12	8		II.	Sh.	In.
	12	9		I.	Tr.	Eg.
	14	21		II.	Tr.	In.
	14	46		II.	Sh.	Eg.
	16	59		II.*	Tr.	Eg.

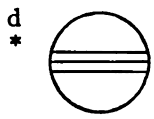
NOTE.—In. denotes ingress; Eg., egress; Dis., disappearance; Re., reappearance; Ec., eclipse.
Oc. denotes occultation; Tr., transit of the satellite; Sh., transit of the shadow; * Visible at Washington.

WASHINGTON MEAN TIME.

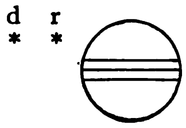
JANUARY.

Phases of the Eclipses of the Satellites for an Inverting Telescope.

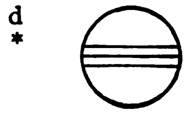
I.



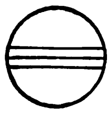
III.



II.



IV. No Eclipse.



Configurations at 17ʰ 30ᵐ for an Inverting Telescope.

Day.	West.		East.
1	4· 1· 3·	○	·2
2	4· 3·	○	1·2·
3	·4 ·3 2· ·1	○	
4	·4 ·3·2	○	1·
5	·4	○	·3·2 ·1 ●
6	○2· ·4 1·	○	·3
7	·2	○	·4 ·1 3·
8	1· 3·	○	·2 ·4
9	3·	○	·1 2· ·4
10	·3 2· ·1	○	·4
11	·3 ·2	○	1· ·4
12	·1	○	·3 ·2 4·
13	○1·	○	2· ·3 4·
14	2·	○	·1 3· 4·
15	1·	○	·2 3·4·
16	3· 4·	○	·1 2·
17	4· ·3 1·2·	○	
18	4· ·3 ·2	○	1·
19	4· ·1	○	·3 ·2
20	·4	○	1· 2· ·3
21	·4 2·	○	3· ·1 ●
22	·4 1·	○	3· ·2 ●
23	3· ·4	○	·1 2·
24	3· 1· 2·	○	·4
25	·3 ·2	○	1· ·4
26	·1	○	·3 ·2 ·4
27		○	1·2· ·3 ·4
28	2·	○	3· 4· ·1 ●
29	○1·	○	3· 4· ·2 ●
30	3·	○	·1 ·2 4·
31	3· 1· 2·	○	4·

WASHINGTON MEAN TIME.

FEBRUARY.

d	h	m	s			
1	6	10	28	I.	Ec.	Dis.
	9	26		I.	Oc.	Re.
2	3	19		I.	Sh.	In.
	4	25		I.	Tr.	In.
	5	32		I.	Sh.	Eg.
	6	35	32	II.	Ec.	Dis.
	6	38		I.	Tr.	Eg.
	11	22		II.	Oc.	Re.
	14	22	6	III.	Ec.	Dis.
	15	58	24	III.*	Ec.	Re.
	18	42		III.	Oc.	Dis.
	20	38		III.	Oc.	Re.
3	0	38	48	I.	Ec.	Dis.
	3	56		I.	Oc.	Re.
	21	48		I.	Sh.	In.
	22	54		I.	Tr.	In.
4	0	0		I.	Sh.	Eg.
	1	7		I.	Tr.	Eg.
	1	26		II.	Sh.	In.
	3	43		II.	Tr.	In.
	4	4		II.	Sh.	Eg.
	6	21		II.	Tr.	Eg.
	19	7	15	I.	Ec.	Dis.
	22	25		I.	Oc.	Re.
5	16	16		I.*	Sh.	In.
	17	24		I.*	Tr.	In.
	18	28		I.*	Sh.	Eg.
	19	36		I.	Tr.	Eg.
	19	52	3	II.	Ec.	Dis.
6	0	42		II.	Oc.	Re.
	4	3		III.	Sh.	In.
	5	55		III.	Sh.	Eg.
	8	38		III.	Tr.	In.
	10	34		III.	Tr.	Eg.
	13	35	36	I.	Ec.	Dis.
	16	54		I.*	Oc.	Re.
7	10	44		I.	Sh.	In.
	11	53		I.	Tr.	In.
	12	57		I.	Sh.	Eg.
	14	5		I.	Tr.	Eg.
	14	43		II.	Sh.	In.
	17	4		II.*	Tr.	In.
	17	21		II.*	Sh.	Eg.
	19	43		II.	Tr.	Eg.
8	8	4	3	I.	Ec.	Dis.
	11	24		I	Oc.	Re.
9	5	12		I	Sh.	In.
	6	22		I.	Tr.	In.
	7	25		I	Sh.	Eg.
	8	34		I.	Tr.	Eg.
	9	8	33	II.	Ec.	Dis.
	14	2		II.	Oc.	Re.
	18	19	10	III.*	Ec.	Dis.
	19	56	34	III.	Ec.	Re.
	22	53		III.	Oc.	Dis.
10	0	50		III.	Oc.	Re.
	2	32	22	I.	Ec.	Dis.
	5	53		I.	Oc.	Re.
	23	41		I.	Sh.	In.
11	0	51		I.	Tr.	In.
11	1	53		I.	Sh.	Eg.
	3	3		I.	Tr.	Eg.
	4	1		II.	Sh.	In.
	6	25		II.	Tr.	In.
	6	39		II.	Sh.	Eg.
	9	4		II.	Tr.	Eg.
	21	0	48	I.	Ec.	Dis.
12	0	22		I.	Oc.	Re.
	18	9		I.*	Sh.	In.
	19	20		I.	Tr.	In.
	20	22		I.	Sh.	Eg.
	21	32		I.	Tr.	Eg.
	22	25	5	II.	Ec.	Dis.
13	3	22		II.	Oc.	Re.
	8	0		III.	Sh.	In.
	9	53		III.	Sh.	Eg.
	12	48		III.	Tr.	In.
	14	45		III.	Tr.	Eg.
	15	29	8	I.*	Ec.	Dis.
	18	51		I.	Oc.	Re.
14	12	37		I.	Sh.	In.
	13	48		I.	Tr.	In.
	14	50		I.*	Sh.	Eg.
	16	1		I.*	Tr.	Eg.
	17	19		II.*	Sh.	In.
	19	45		II.	Tr.	In.
	19	57		II.	Sh.	Eg.
	22	24		II.	Tr.	Eg.
15	9	57	34	I.	Ec.	Dis.
	13	20		I.	Oc.	Re.
16	7	5		I.	Sh.	In.
	8	17		I.	Tr.	In.
	9	18		I.	Sh.	Eg.
	10	30		I.	Tr.	Eg.
	11	41	37	II.	Ec.	Dis.
	16	41		II.*	Oc.	Re.
	22	16	11	III.	Ec.	Dis.
	23	54	42	III.	Ec.	Re.
17	3	2		III.	Oc.	Dis.
	4	25	53	I.	Ec.	Dis.
	4	58		III.	Oc.	Re.
	7	49		I.	Oc.	Re.
18	1	34		I.	Sh.	In.
	2	46		I.	Tr.	In.
	3	46		I.	Sh.	Eg.
	4	59		I.	Tr.	Eg.
	6	37		II.	Sh.	In.
	9	6		II.	Tr.	In.
	9	15		II.	Sh.	Eg.
	11	44		II.	Tr.	Eg.
	22	54	18	I.	Ec.	Dis.
19	2	18		I.	Oc.	Re.
	20	2		I.	Sh.	In.
	21	15		I.	Tr.	In.
	22	15		I.	Sh.	Eg.
	23	28		I.	Tr.	Eg.
20	0	58	10	II.	Ec.	Dis.
	6	0		II.	Oc.	Re.
	11	58		III.	Sh.	In.
20	13	51		III.	Sh.	Eg.
	16	55		III.*	Tr.	In.
	17	22	38	I.*	Ec.	Dis.
	18	51		III.	Tr.	Eg.
	20	47		I.	Oc.	Re.
21	14	30		I.*	Sh.	In.
	15	44		I.*	Tr.	In.
	16	43		I.*	Sh.	Eg.
	17	56		I.*	Tr.	Eg.
	19	54		II.	Sh.	In.
	22	25		II.	Tr.	In.
	22	32		II.	Sh.	Eg.
22	1	3		II.	Tr.	Eg.
	11	51	3	I.	Ec.	Dis.
	15	15		I.*	Oc.	Re.
23	8	58		I.	Sh.	In.
	10	12		I.	Tr.	In.
	11	11		I.	Sh.	Eg.
	12	25		I.	Tr.	Eg.
	14	14	46	II.	Ec.	Dis.
	19	18		II.	Oc.	Re.
24	2	13	32	III.	Ec.	Dis.
	3	53	10	III.	Ec.	Re.
	6	19	21	I.	Ec.	Dis.
	7	7		III.	Oc.	Dis.
	9	4		III.	Oc.	Re.
	9	44		I.	Oc.	Re.
25	3	27		I.	Sh.	In.
	4	41		I.	Tr.	In.
	5	39		I.	Sh.	Eg.
	6	54		I.	Tr.	Eg.
	9	12		II.	Sh.	In.
	11	44		II.	Tr.	In.
	11	50		II.	Sh.	Eg.
	14	22		II.*	Tr.	Eg
26	0	47	45	I.	Ec.	Dis.
	4	13		I.	Oc.	Re
	21	55		I.	Sh.	In.
	23	9		I.	Tr.	In.
27	0	8		I.	Sh.	Eg.
	1	22		I.	Tr.	Eg.
	3	31	21	II.	Ec.	Dis.
	8	36		II.	Oc.	Re.
	15	55		III.*	Sh.	In.
	17	50		III.*	Sh.	Eg.
	19	16	5	I.	Ec.	Dis.
	20	58		III.	Tr.	In.
	22	42		I.	Oc.	Re.
	22	54		III.	Tr.	Eg.
28	16	23		I.*	Sh.	In.
	17	38		I.*	Tr.	In.
	18	36		I.	Sh.	Eg.
	19	51		I.	Tr.	Eg.
	22	29		II.	Sh.	In.
29	1	3		II.	Tr.	In.
	1	8		II.	Sh.	Eg.
	3	41		II.	Tr.	Eg.
	13	44	29	I.	Ec.	Dis.
	17	10		I.*	Oc.	Re.

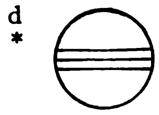
NOTE.—In. denotes ingress; Eg., egress; Dis., disappearance; Re., reappearance; Ec., eclipse. *Oc. denotes* occultation; Tr., transit of the satellite; Sh., transit of the shadow; * Visible at Washington.

WASHINGTON MEAN TIME.

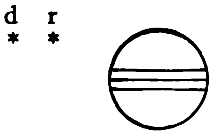
FEBRUARY.

Phases of the Eclipses of the Satellites for an Inverting Telescope.

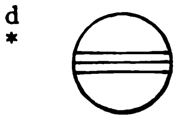
I.



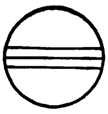
III.



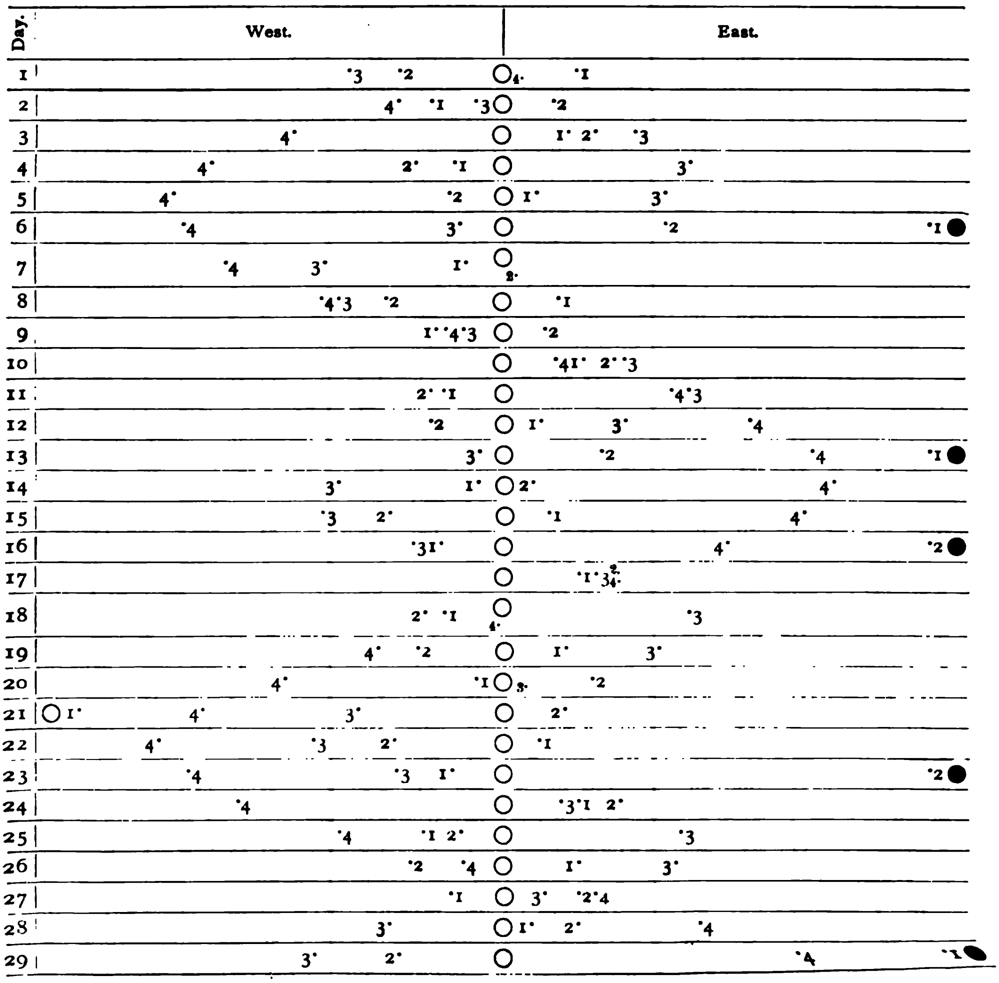
II.



IV. No Eclipse.



Configurations at 16h 30m for an Inverting Telescope.



JUPITER'S SATELLITES, 1912.

WASHINGTON MEAN TIME.

MARCH.

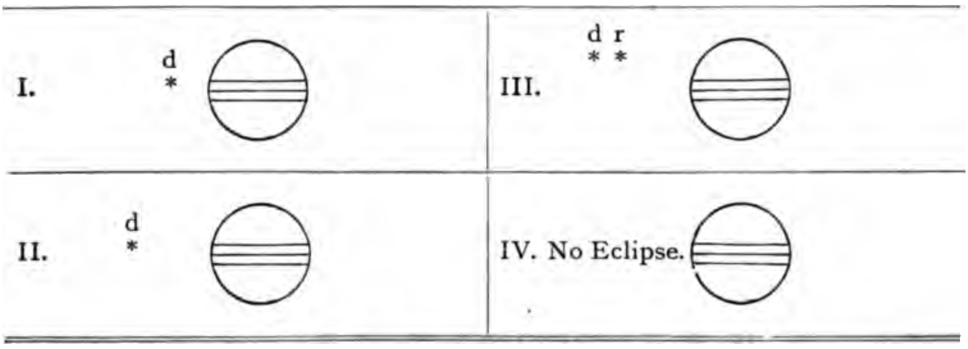
d	h	m	s			
1	10	51		I.	Sh.	In.
	12	6		I.	Tr.	In.
	13	4		I.	Sh.	Eg.
	14	19		I.*	Tr.	Eg.
	16	48	0	II.*	Ec.	Dis.
	21	53		II.	Oc.	Re.
2	6	10	49	III.	Ec.	Dis.
	7	51	37	III.	Ec.	Re.
	8	12	47	I.	Ec.	Dis.
	11	9		III.	Oc.	Dis.
	11	39		I.	Oc.	Re.
	13	5		III.	Oc.	Re.
3	5	20		I.	Sh.	In.
	6	35		I.	Tr.	In.
	7	32		I.	Sh.	Eg.
	8	48		I.	Tr.	Eg.
	11	47		II.	Sh.	In.
	14	21		II.*	Tr.	In.
	14	26		II.*	Sh.	Eg
	16	59		II.*	Tr.	Eg.
4	2	41	10	I.	Ec.	Dis.
	6	7		I.	Oc.	Re.
	23	48		I.	Sh.	In.
5	1	3		I.	Tr.	In.
	2	1		I.	Sh.	Eg.
	3	16		I.	Tr.	Eg.
	6	4	38	II.	Ec.	Dis.
	11	10		II.	Oc.	Re.
	19	51		III.	Sh.	In.
	21	9	30	I.	Ec.	Dis.
	21	47		III.	Sh.	Eg.
6	0	35		I.	Oc.	Re.
	0	58		III.	Tr.	In.
	2	53		III.	Tr.	Eg.
	18	16		I.	Sh.	In.
	19	31		I.	Tr.	In.
	20	29		I.	Sh.	Eg.
	21	44		I.	Tr.	Eg.
7	1	5		II.	Sh.	In.
	3	38		II.	Tr.	In.
	3	43		II.	Sh.	Eg.
	6	15		II.	Tr.	Eg.
	15	37	53	I.*	Ec.	Dis.
	19	4		I.	Oc.	Re.
8	12	44		I.	Sh.	In.
	14	0		I.*	Tr.	In.
	14	57		I.*	Sh.	Eg.
	16	12		I.*	Tr.	Eg.
	19	21	21	II.	Ec.	Dis.
9	0	27		II.	Oc.	Re.
	10	6	12	I.	Ec.	Dis.
	10	8	41	III.	Ec.	Dis.
	11	50	40	III.	Ec.	Re.
	13	32		I.*	Oc.	Re.
	15	8		III.*	Oc.	Dis.
	17	3		III.*	Oc.	Re.
10	7	13		I.	Sh.	In.
	8	28		I.	Tr.	In.
	9	26		I.	Sh.	Eg.
	10	41		I.	Tr.	Eg.
	14	22		II.*	Sh.	In.
	16	56		II.*	Tr.	In.
	17	1		II.*	Sh.	Eg.
	19	33		II.	Tr.	Eg.
11	4	34	34	I.	Ec.	Dis.
11	8	0		I.	Oc	Re.
12	1	41		I.	Sh.	In.
	2	56		I.	Tr.	In.
	3	54		I.	Sh.	Eg.
	5	9		I.	Tr.	Eg.
	8	38	2	II.	Ec.	Dis.
	13	43		II.*	Oc.	Re.
	23	2	54	I.	Ec.	Dis.
	23	48		III.	Sh.	In.
13	1	45		III.	Sh.	Eg.
	2	28		I.	Oc.	Re.
	4	53		III.	Tr.	In.
	6	48		III.	Tr.	Eg.
	20	9		I.	Sh.	In.
	21	24		I.	Tr.	In.
	22	22		I.	Sh.	Eg.
	23	37		I.	Tr.	Eg.
14	3	40		II.	Sh.	In.
	6	12		II.	Tr.	In.
	6	18		II.	Sh.	Eg.
	8	50		II.	Tr.	Eg.
	17	31	18	I.*	Ec.	Dis.
	20	56		I.	Oc.	Re.
15	14	37		I.*	Sh.	In.
	15	52		I.*	Tr	In.
	16	50		I.*	Sh.	Eg.
	18	4		I.	Tr.	Eg.
	21	54	51	II.	Ec.	Dis.
16	2	59		II.	Oc.	Re.
	11	59	35	I.	Ec.	Dis.
	14	5	56	III.*	Ec.	Dis.
	15	24		I.*	Oc.	Re.
	15	49	8	III.*	Ec.	Re.
	19	1		III.	Oc.	Dis.
	20	56		III.	Oc.	Re.
17	9	6		I.	Sh.	In.
	10	20		I.	Tr.	In.
	11	19		I.	Sh.	Eg.
	12	32		I.	Tr.	Eg.
	16	57		II.*	Sh.	In.
	19	28		II.	Tr.	In.
	19	36		II.	Sh.	Eg.
	22	6		II	Tr.	Eg.
18	6	27	58	I.	Ec.	Dis.
	9	52		I.	Oc.	Re.
19	3	34		I.	Sh.	In.
	4	47		I.	Tr.	In.
	5	47		I.	Sh.	Eg.
	7	0		I.	Tr.	Eg.
	11	11	35	II.	Ec.	Dis.
	16	14		II.*	Oc.	Re.
20	0	56	17	I.	Ec.	Dis.
	3	45		III.	Sh.	In.
	4	20		I.	Oc.	Re.
	5	43		III.	Sh.	Eg.
	8	44		III.	Tr.	In.
	10	30		III.	Tr.	Eg.
	22	2		I.	Sh.	In.
	23	15		I.	Tr.	In.
21	0	15		I.	Sh.	Eg.
	1	28		I.	Tr.	Eg.
	6	14		II.	Sh.	In.
	8	43		II.	Tr.	In.
	8	53		II.	Sh.	Eg.
21	11	21		II.	Tr.	Eg.
	19	24	40	I.	Ec.	Dis.
	22	48		I.	Oc.	Re.
22	16	30		I.*	Sh.	In.
	17	43		I.	Tr.	In.
	18	44		I.	Sh.	Eg.
	19	56		I.	Tr.	Eg.
23	0	28	31	II.	Ec.	Dis.
	5	28		II.	Oc.	Re.
	13	52	58	I.*	Ec.	Dis.
	17	16		I.*	Oc.	Re.
	18	3	14	III.	Ec.	Dis.
	19	47	38	III.	Ec.	Re.
	22	50		III.	Oc.	Dis.
24	0	45		III.	Oc.	Re.
	10	59		I.	Sh.	In.
	12	10		I.	Tr.	In.
	13	12		I.*	Sh.	Eg.
	14	23		I.*	Tr.	Eg.
	19	32		II.	Sh.	In.
	21	58		II.	Tr.	In.
	22	11		II.	Sh.	Eg.
25	0	35		II.	Tr.	Eg.
	8	21	21	I.	Ec.	Dis.
	11	43		I.	Oc.	Re.
26	5	27		I.	Sh.	In.
	6	38		I.	Tr.	In.
	7	40		I.	Sh.	Eg.
	8	51		I.	Tr.	Eg.
	13	45	19	II.*	Ec.	Dis.
	18	43		II.	Oc.	Re.
27	2	49	40	I.	Ec.	Dis.
	6	11		I.	Oc.	Re
	7	42		III.	Sh.	In.
	9	41		III.	Sh.	Eg.
	12	31		III.*	Tr.	In.
	14	25		III.*	Tr.	Eg.
	23	55		I.	Sh.	In.
28	1	6		I.	Tr.	In.
	2	8		I.	Sh.	Eg.
	3	18		I.	Tr.	Eg.
	8	49		II.	Sh.	In.
	11	12		II.	Tr.	In.
	11	28		II.	Sh.	Eg.
	13	49		II.*	Tr.	Eg.
	21	18	4	I.	Ec.	Dis.
29	0	38		I.	Oc.	Re
	18	24		I.	Sh.	In.
	19	33		I.	Tr.	In.
	20	37		I.	Sh.	Eg.
	21	46		I.	Tr.	Eg.
30	3	2	22	II.	Ec.	Dis.
	7	57		II.	Oc.	Re.
	15	46	22	I.*	Ec.	Dis.
	19	6		I.	Oc.	Re.
	22	0	10	III.	Ec.	Dis.
	23	45	48	III.	Ec.	Re.
31	2	35		III.	Oc.	Dis.
	4	29		III.	Oc.	Re.
	12	52		I.*	Sh.	In.
	14	0		I.*	Tr.	In.
	15	5		I.*	Sh.	Eg.
	16	13		I.*	Tr.	Eg.
	22	7		II.	Sh.	In.

***Note.**—In. denotes ingress; Eg., egress; Dis., disappearance; Re., reappearance; Ec., eclipse.*
*Oc. denotes occultation; Tr., transit of the satellite; Sh., transit of the shadow; * Visible at Washington.*

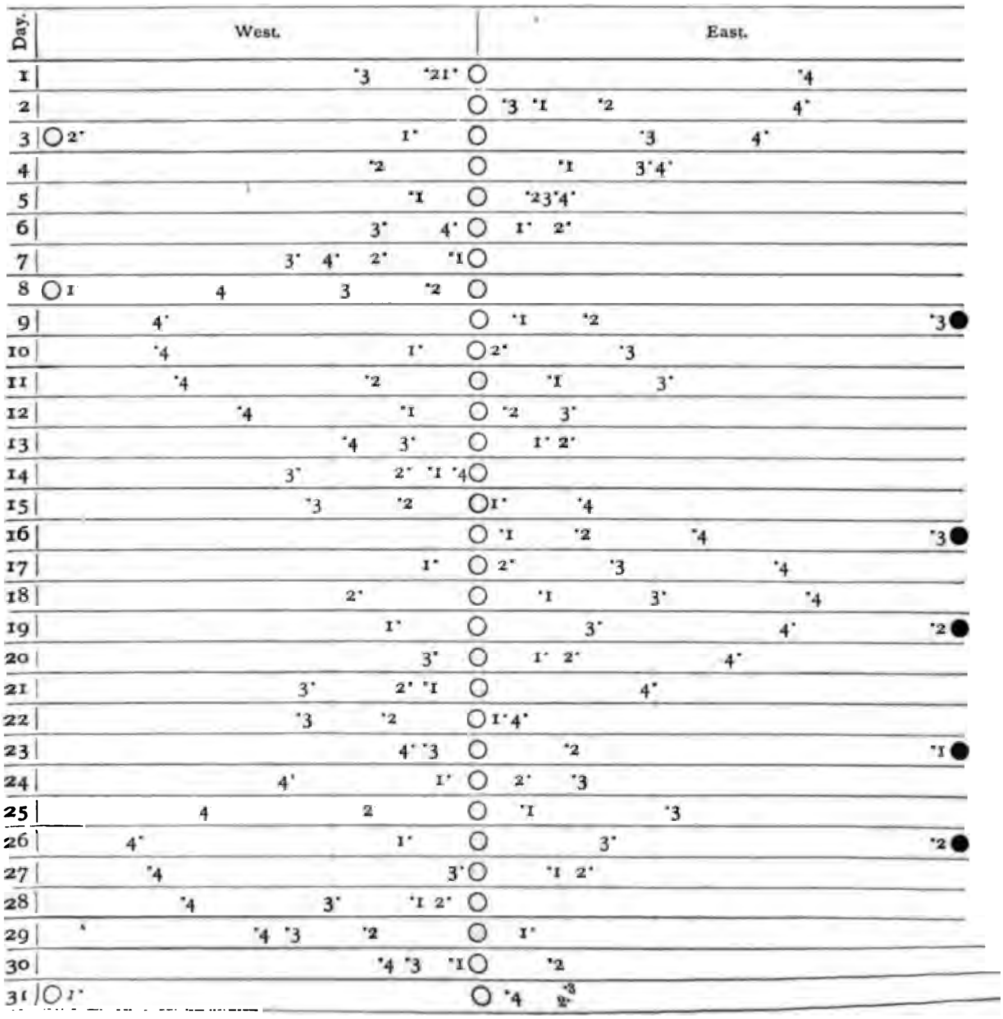
WASHINGTON MEAN TIME.

MARCH.

Phases of the Eclipses of the Satellites for an Inverting Telescope.



Configurations at 15^h 30^m for an Inverting Telescope.



JUPITER'S SATELLITES, 1912.

WASHINGTON MEAN TIME.

APRIL.

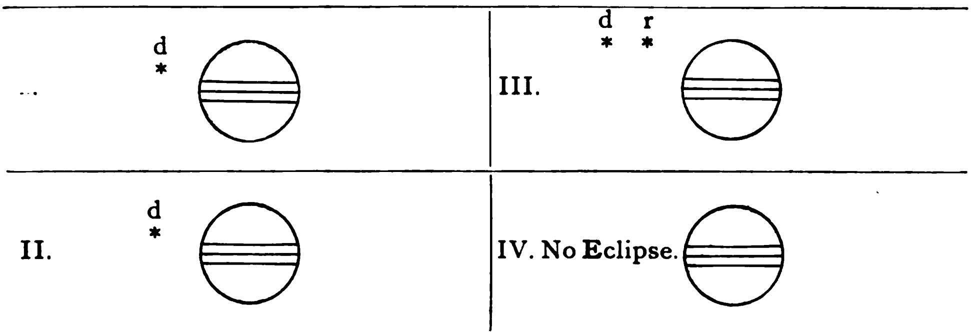
d	h	m	s			
1	0	26		II.	Tr.	In.
	0	46		II.	Sh.	Eg.
	3	3		II.	Tr.	Eg.
	10	14	44	I.	Ec.	Dis.
	13	33		I.*	Oc.	Re.
2	7	20		I.	Sh.	In.
	8	28		I.	Tr.	In.
	9	33		I.	Sh.	Eg.
	10	40		I.	Tr.	Eg.
	16	19	13	II.*	Ec.	Dis.
	21	10		II.	Oc.	Re.
3	4	43	4	I.	Ec.	Dis.
	8	0		I.	Oc.	Re.
	11	40		III.	Sh.	In.
	13	40		III.*	Sh.	Eg.
	16	14		III.*	Tr.	In.
	18	8		III.	Tr.	Eg.
4	1	49		I.	Sh.	In.
	2	55		I.	Tr.	In.
	4	2		I.	Sh.	Eg.
	5	8		I.	Tr.	Eg.
	11	24		II.	Sh.	In.
	13	38		II.*	Tr.	In.
	14	3		II.*	Sh.	Eg.
	16	16		II.*	Tr.	Eg.
	23	11	28	I.	Ec.	Dis.
5	2	28		I.	Oc.	Re.
	20	17		I.	Sh.	In.
	21	22		I.	Tr.	In.
	22	30		I.	Sh.	Eg.
	23	35		I.	Tr.	Eg.
6	5	36	24	II.	Ec.	Dis.
	10	22		II.	Oc.	Re.
	17	39	47	I.	Ec.	Dis.
	20	55		I.	Oc.	Re.
7	1	57	9	III.	Ec.	Dis.
	3	44	1	III.	Ec.	Re.
	6	15		III.	Oc.	Dis.
	8	8		III.	Oc.	Re.
	14	45		I.*	Sh.	In.
	15	49		I.*	Tr.	In.
	16	58		I.*	Sh.	Eg.
	18	2		I.	Tr.	Eg.
8	0	41		II.	Sh.	In.
	2	51		II.	Tr.	In.
	3	20		II.	Sh.	Eg.
	5	28		II.	Tr.	Eg.
	12	8	9	I.*	Ec.	Dis.
	15	22		I.*	Oc.	Re.
9	9	14		I.	Sh.	In.
	10	16		I.	Tr.	In.
	11	27		I.	Sh.	Eg.
	12	29		I.*	Tr.	Eg.
	18	53	20	II.	Ec.	Dis.
	23	34		II.	Oc.	Re.
10	6	36	30	I.	Ec.	Dis.
	9	49		I.	Oc.	Re.
	15	38		III.*	Sh.	In.
	17	39		III.	Sh.	Eg.
	19	52		III.	Tr.	In.
	21	45		III.	Tr.	Eg.
11	3	42		I.	Sh.	In.
11	4	44		I.	Tr.	In.
	5	55		I.	Sh.	Eg.
	6	56		I.	Tr.	Eg.
	13	58		II.*	Sh.	In.
	16	2		II.*	Tr.	In.
	16	37		II.*	Sh.	Eg.
	18	40		II.	Tr.	Eg.
12	1	4	54	I.	Ec.	Dis.
	4	16		I.	Oc.	Re.
	22	10		I.	Sh.	In.
	23	10		I.	Tr.	In.
13	0	24		I.	Sh.	Eg.
	1	23		I.	Tr.	Eg.
	8	10	40	II.	Ec.	Dis.
	12	46		II.*	Oc.	Re.
	19	33	13	I.	Ec.	Dis.
	22	43		I.	Oc.	Re.
14	5	54	34	III.	Ec.	Dis.
	7	42	41	III.	Ec.	Re.
	9	50		III.	Oc.	Dis.
	11	43		III.*	Oc.	Re.
	16	39		I.*	Sh.	In.
	17	37		I.	Tr.	In.
	18	52		I.	Sh.	Eg.
	19	50		I.	Tr.	Eg.
15	3	16		II.	Sh.	In.
	5	14		II.	Tr.	In.
	5	55		II.	Sh.	Eg.
	7	51		II.	Tr.	Eg.
	14	1	36	I.*	Ec.	Dis.
	17	10		I.	Oc.	Re.
16	11	7		I.*	Sh.	In.
	12	4		I.*	Tr.	In.
	13	20		I.*	Sh.	Eg.
	14	17		I.*	Tr.	Eg.
	21	27	41	II.	Ec.	Dis.
17	1	57		II.	Oc.	Re.
	8	29	57	I.	Ec.	Dis.
	11	36		I.*	Oc.	Re.
	19	35		III.	Sh.	In.
	21	37		III.	Sh.	Eg.
	23	25		III.	Tr.	In.
18	1	18		III.	Tr.	Eg.
	5	35		I.	Sh.	In.
	6	31		I.	Tr.	In.
	7	49		I.	Sh.	Eg.
	8	43		I.	Tr.	Eg.
	16	33		II.*	Sh.	In.
	18	24		II	Tr.	In.
	19	12		II.	Sh.	Eg.
	21	2		II.	Tr.	Eg.
19	2	58	22	I.	Ec.	Dis.
	6	3		I.	Oc.	Re.
20	0	4		I	Sh.	In.
	0	57		I.	Tr.	In.
	2	17		I.	Sh.	Eg.
	3	10		I.	Tr.	Eg.
	10	45	9	II.*	Ec.	Dis.
	15	8		II.*	Oc.	Re.
	21	26	42	I.	Ec.	Dis.
21	0	30		I.	Oc.	Re.
	9	52	0	III.	Ec.	Dis.
21	11	41	22	III.*	Ec.	Re.
	13	22		III.*	Oc.	Dis.
	15	14		III.*	Oc.	Re.
	18	32		I.	Sh.	In.
	19	24		I.	Tr.	In.
	20	45		I.	Sh.	Eg.
	21	37		I.	Tr.	Eg.
22	5	50		II.	Sh.	In.
	7	35		II.	Tr.	In.
	8	30		II.	Sh.	Eg.
	10	12		II.	Tr.	Eg.
	15	55	6	I.*	Ec.	Dis.
	18	56		I.	Oc.	Re.
23	13	1		I.*	Sh.	In.
	13	51		I.*	Tr.	In.
	15	14		I.*	Sh.	Eg.
	16	3		I.*	Tr.	Eg.
24	0	2	16	II.	Ec.	Dis.
	4	18		II.	Oc.	Re.
	10	23	27	I.	Ec.	Dis.
	13	23		I.*	Oc.	Re.
	23	32		III.	Sh.	In.
25	1	36		III.	Sh.	Eg.
	2	54		III.	Tr.	In.
	4	46		III.	Tr.	Eg.
	7	29		I.	Sh.	In.
	8	17		I.	Tr.	In.
	9	42		I.	Sh.	Eg.
	10	30		I.*	Tr.	Eg.
	19	7		II.	Sh.	In.
	20	44		II.	Tr.	In.
	21	47		II.	Sh.	Eg.
	23	21		II.	Tr.	Eg.
26	4	51	53	I.	Ec.	Dis.
	7	50		I.	Oc.	Re.
27	1	57		I.	Sh.	In.
	2	44		I.	Tr.	In.
	4	11		I.	Sh.	Eg.
	4	56		I.	Tr.	Eg.
	13	19	54	II.*	Ec.	Dis.
	17	28		II.	Oc.	Re.
	23	20	14	I.	Ec.	Dis.
28	2	16		I.	Oc.	Re.
	13	50	6	III.*	Ec.	Dis.
	15	40	45	III.*	Ec.	Re.
	16	49		III.	Oc.	Dis.
	18	42		III.	Oc.	Re.
	20	26		I.	Sh.	In.
	21	10		I.	Tr.	In.
	22	39		I.	Sh.	Eg.
	23	23		I.	Tr.	Eg.
29	8	25		II.	Sh	In.
	9	53		II.	Tr.	In.
	11	4		II.*	Sh.	Eg.
	12	31		II.*	Tr.	Eg.
	17	48	39	I.	Ec.	Dis.
	20	42		I.	Oc.	Re.
30	14	54		I.*	Sh.	In.
	15	37		I.*	Tr.	In.
	17	7		I.	Sh.	Eg.
	17	49		I.	Tr.	Eg.

NOTE.—In. denotes ingress; Eg., egress; Dis., disappearance; Re., reappearance; Ec., eclipse.
Oc. denotes occultation; Tr., transit of the satellite; Sh., transit of the shadow; * **Visible at Washington.**

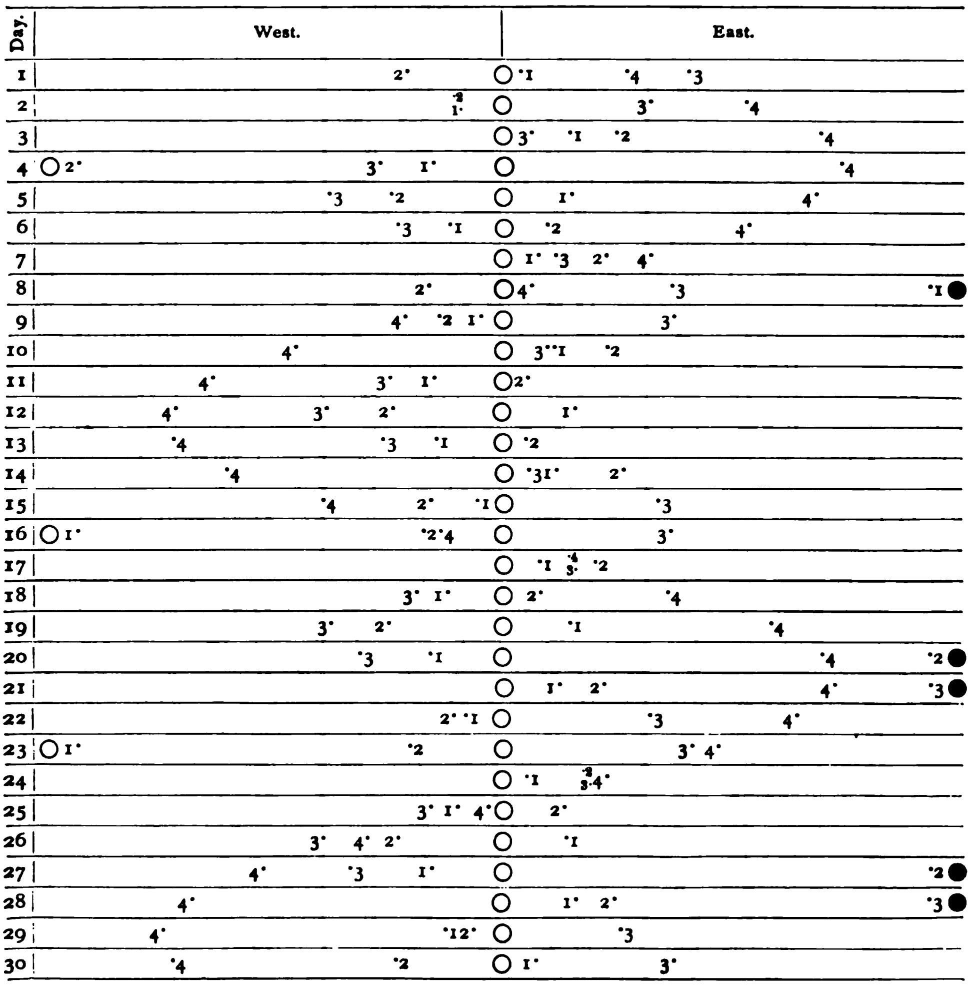
WASHINGTON MEAN TIME.

APRIL.

Phases of the Eclipses of the Satellites for an Inverting Telescope.



Configurations at 14h 0m for an Inverting Telescope.



WASHINGTON MEAN TIME.

MAY.

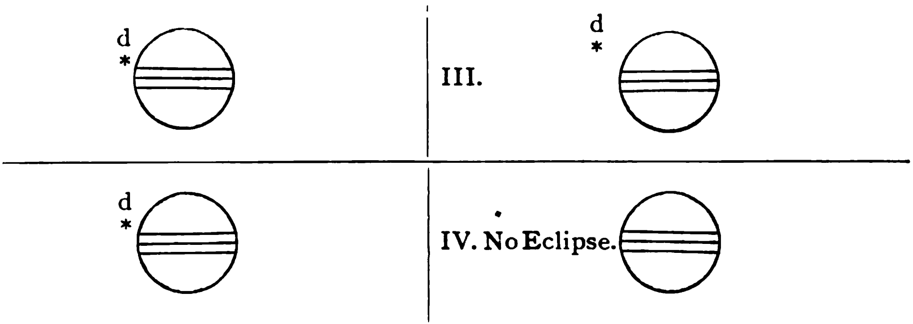
d	h	m	s				d	h	m	s				d	h	m	s			
1	2	37	6	II.	Ec.	Dis.	**11**	6	14		I.	Tr.	In.	**21**	22	49		I.	Sh.	Eg.
	6	37		II.	Oc.	Re.		7	58		I.	Sh.	Eg.		23	3		I.	Tr.	Eg.
	12	17	1	I.*	Ec.	Dis.		8	27		I.	Tr.	Eg.	**22**	10	23	14	II.*	Ec.	Dis.
	15	9		I.*	Oc.	Re.		18	30	11	II.	Ec.	Dis.		13	27		II.*	Oc.	Re.
2	3	30		III.	Sh.	In.		22	3		II.	Oc.	Re.		17	58	11	I.	Ec.	Dis.
	5	34		III.	Sh.	Eg.	**12**	3	7	32	I.	Ec.	Dis.		20	22		I.	Oc.	Re.
	6	19		III.	Tr.	In.		5	46		I.	Oc.	Re.	**23**	15	5		I.*	Sh.	In.
	8	11		III.	Tr.	Eg.		21	45	21	III.	Ec.	Dis.		15	17		I.*	Tr.	In.
	9	23		I.	Sh.	In.	**13**	0	13		I.	Sh.	In.		15	24		III.*	Sh.	In.
	10	3		I.*	Tr.	In.		0	40		I.	Tr.	In.		16	18		III.	Tr.	In.
	11	36		I.*	Sh.	Eg.		1	26		III.	Oc.	Re.		17	18		I.	Sh.	Eg.
	12	16		I.*	Tr.	Eg.		2	27		I.	Sh.	Eg.		17	29		I.	Tr.	Eg.
	21	42		II.	Sh.	In.		2	53		I.	Tr.	Eg.		17	32		III.	Sh.	Eg.
	23	2		II.	Tr.	In.		13	33		II.*	Sh.	In.		18	12		III.	Tr.	Eg.
3	0	21		II.	Sh.	Eg.		14	26		II.*	Tr.	In.	**24**	5	25		II.	Sh.	In.
	1	40		II.	Tr.	Eg.		16	13		II.*	Sh.	Eg.		5	48		II.	Tr.	In.
	6	45	28	I.	Ec.	Dis.		17	3		II.	Tr.	Eg.		8	5		II.	Sh.	Eg.
	9	35		I.	Oc.	Re.		21	35	58	I.	Ec.	Dis.		8	25		II.*	Tr.	Eg.
4	3	51		I.	Sh.	In.	**14**	0	12		I.	Oc.	Re.		12	26	42	I.*	Ec.	Dis.
	4	29		I.	Tr.	In.		18	42		I.	Sh.	In.		14	48		I.*	Oc.	Re.
	6	4		I.	Sh.	Eg.		19	6		I.	Tr.	In.	**25**	9	33		I.*	Sh.	In.
	6	42		I.	Tr.	Eg.		20	55		I.	Sh.	Eg.		9	43		I.*	Tr.	In.
	15	54	55	II.*	Ec.	Dis.		21	19		I.	Tr.	Eg.		11	46		I.*	Sh.	Eg.
	19	46		II.	Oc.	Re.	**15**	7	47	35	II.	Ec.	Dis.		11	55		I.*	Tr.	Eg.
5	1	13	51	I.	Ec.	Dis.		11	11		II.*	Oc.	Re.		23	41	32	II.	Ec.	Dis.
	4	1		I.	Oc.	Re.		16	4	23	I.*	Ec.	Dis.	**26**	2	35		II.	Oc.	Re.
	17	47	41	III.	Ec.	Dis.		18	38		I.	Oc.	Re.		6	55	8	I.	Ec.	Dis.
	19	39	36	III.	Ec.	Re.	**16**	11	26		III.*	Sh.	In.		9	14		I.*	Oc.	Re.
	20	13		III.	Oc.	Dis.		13	0		III.*	Tr.	In.	**27**	4	2		I.	Sh.	In.
	22	5		III.	Oc.	Re.		13	10		I.*	Sh.	In.		4	9		I.	Tr.	In.
	22	20		I.	Sh.	In.		13	32		III.*	Sh.	Eg.		5	40	22	III.	Ec.	Dis.
	22	56		I.	Tr.	In.		13	32		I.*	Tr.	In.		6	15		I.	Sh.	Eg.
6	0	33		I.	Sh.	Eg.		14	53		III.*	Tr.	Eg.		6	21		I.	Tr.	Eg.
	1	8		I.	Tr.	Eg.		15	24		I.*	Sh.	Eg.		8	1		III.*	Oc.	Re.
	10	59		II.*	Sh.	In.		15	45		I.*	Tr.	Eg.		18	42		II.	Sh.	In.
	12	10		II.*	Tr.	In.	**17**	2	51		II.	Sh.	In.		18	54		II.	Tr.	In.
	13	38		II.*	Sh.	Eg.		3	34		II.	Tr.	In.		21	22		II.	Sh.	Eg.
	14	48		II.*	Tr.	Eg.		5	30		II.	Sh.	Eg.		21	32		II.	Tr.	Eg.
	19	42	16	I.	Ec.	Dis.		6	10		II.	Tr.	Eg.	**28**	1	23	37	I.	Ec.	Dis.
	22	27		I.	Oc.	Re.		10	32	52	I.*	Ec.	Dis.		3	40		I.	Oc.	Re.
7	16	48		I.	Sh.	In.		13	4		I.*	Oc.	Re.		22	30		I.	Sh.	In.
	17	22		I.	Tr.	In.	**18**	7	39		I.	Sh.	In.		22	35		I.	Tr.	In.
	19	1		I.	Sh.	Eg.		7	58		I.	Tr.	In.	**29**	0	44		I.	Sh.	Eg.
	19	34		I.	Tr.	Eg.		9	52		I.*	Sh.	Eg.		0	47		I.	Tr.	Eg.
8	5	12	13	II.	Ec.	Dis.		10	11		I.*	Tr.	Eg.		12	59	8	II.*	Ec.	Dis.
	8	55		II.	Oc.	Re.		21	5	43	II.	Ec.	Dis.		15	42		II.*	Oc.	Re.
	14	10	40	I.*	Ec.	Dis.	**19**	0	19		II.	Oc.	Re.		19	52	5	I.	Ec.	Dis.
	16	54		I.	Oc.	Re.		5	1	17	I.	Ec.	Dis.		22	6		I.	Oc.	Re.
9	7	28		III.	Sh.	In.		7	30		I.	Oc.	Re.	**30**	16	59		I.	Sh.	In.
	9	33		III.*	Sh.	Eg.	**20**	1	42	48	III.	Ec.	Dis.		17	1		I.	Tr.	In.
	9	41		III.*	Tr.	In.		2	8		I.	Sh.	In.		19	12		I.	Sh.	Eg.
	11	16		I.*	Sh.	In.		2	25		I.	Tr.	In.		19	13		I.	Tr.	Eg.
	11	33		III.*	Tr.	Eg.		4	21		I.	Sh.	Eg.		19	22		III.	Sh.	In.
	11	48		I.*	Tr.	In.		4	37		I.	Tr.	Eg.		19	34		III.	Tr.	In.
	13	30		I.*	Sh.	Eg.		4	44		III.	Oc.	Re.		21	29		III.	Tr.	Eg.
	14	0		I.*	Tr.	Eg.		16	8		II.*	Sh.	In.		21	31		III.	Sh.	Eg.
10	0	16		II.	Sh.	In.		16	41		II.	Tr.	In.	**31**	7	59		II.*	Sh.	In.
	1	18		II.	Tr.	In.		18	48		II.	Sh.	Eg.		8	1		II.*	Tr.	In.
	2	56		II.	Sh.	Eg.		19	18		II.	Tr.	Eg.		10	39		II.*	Tr.	Eg.
	3	56		II.	Tr.	Eg.		23	29	45	I.	Ec.	Dis.		10	39		II *	Sh.	Eg.
	8	39	8	I.	Ec.	Dis.	**21**	1	56		I.	Oc.	Re.		14	19		I.*	Oc.	Dis.
	11	20		I.*	Oc.	Re.		20	36		I.	Sh.	In.		16	31		I.	Oc.	Re.
11	5	45		I.	Sh.	In.		20	51		I.	Tr.	In.							

NOTE.—In. denotes ingress; Eg., egress; Dis., disappearance; Re., reappearance; Ec., eclipse.
Oc. denotes occultation; Tr., transit of the satellite; Sh., transit of the shadow; *Visible at Washington.

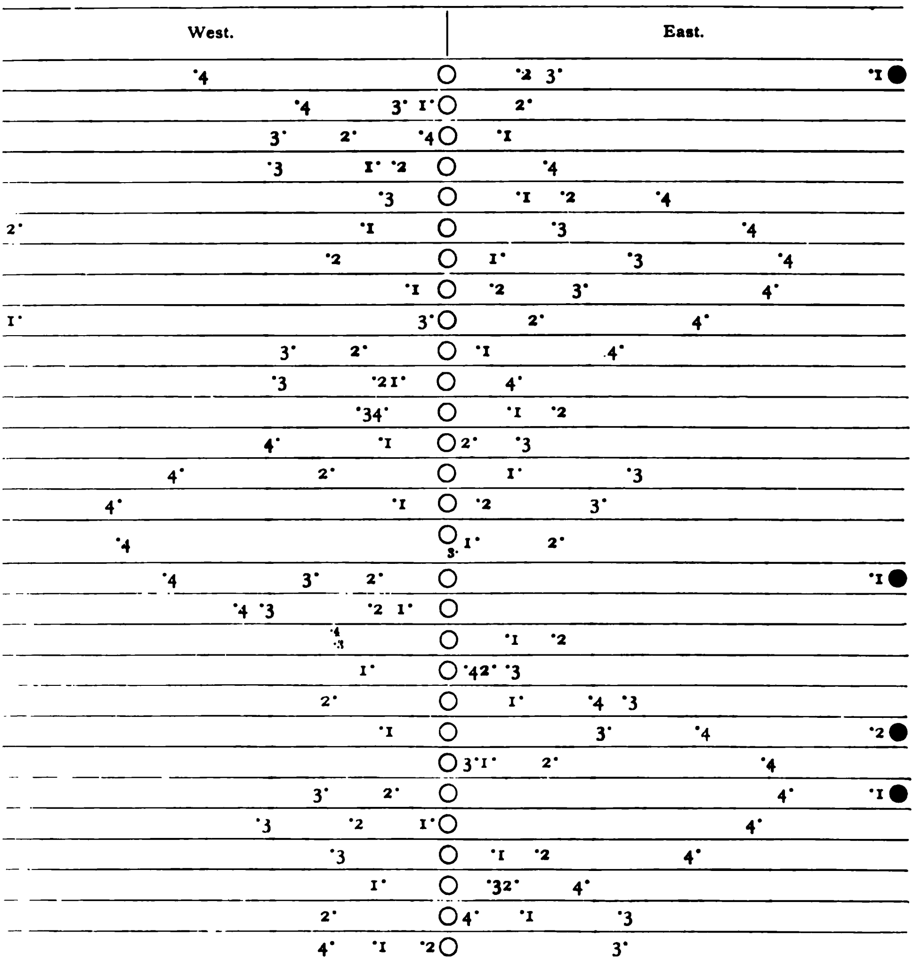
WASHINGTON MEAN TIME.

MAY.

Phases of the Eclipses of the Satellites for an Inverting Telescope.



Configurations at 12^h 30^m for an Inverting Telescope.



JUPITER'S SATELLITES, 1912.

WASHINGTON MEAN TIME.

JUNE.

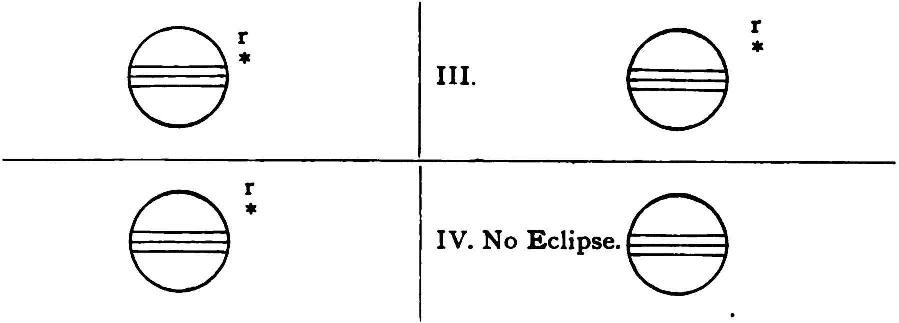
d	h	m	s			
1	11	27		I.*	Tr.	In.
	11	27		I.*	Sh.	In.
	13	39		I.*	Tr.	Eg.
	13	41		I.*	Sh.	Eg.
2	2	12		II.	Oc.	Dis.
	4	53	2	II.	Ec.	Re.
	8	44		I.*	Oc.	Dis.
	10	57	45	I.*	Ec.	Re.
3	5	53		I.	Tr.	In.
	5	56		I.	Sh.	In.
	8	5		I.*	Tr.	Eg.
	8	10		I.*	Sh.	Eg.
	9	23		III.*	Oc.	Dis.
	11	35	36	III.*	Ec.	Re.
	21	8		II.	Tr.	In.
	21	16		II.	Sh.	In.
	23	46		II.	Tr.	Eg.
	23	56		II.	Sh.	Eg.
4	3	10		I.	Oc.	Dis.
	5	26	16	I.	Ec.	Re.
5	0	19		I.	Tr.	In.
	0	25		I.	Sh.	In.
	2	31		I.	Tr.	Eg.
	2	38		I.	Sh.	Eg.
	15	19		II.*	Oc.	Dis.
	18	10	51	II.	Ec.	Re.
	21	36		I.	Oc.	Dis.
	23	54	45	I.	Ec.	Re.
6	18	45		I.	Tr.	In.
	18	53		I.	Sh.	In.
	20	58		I.	Tr.	Eg.
	21	7		I.	Sh.	Eg.
	22	50		III.	Tr.	In.
	23	21		III.	Sh.	In.
7	0	46		III.	Tr.	Eg.
	1	31		III.	Sh.	Eg.
	10	15		II.*	Tr.	In.
	10	34		II.*	Sh.	In.
	12	53		II.*	Tr.	Eg.
	13	14		II.*	Sh.	Eg.
	16	2		I.	Oc.	Dis.
	18	23	19	I.	Ec.	Re.
8	13	11		I.*	Tr.	In.
	13	22		I.*	Sh.	In.
	15	24		I.*	Tr.	Eg.
	15	35		I.*	Sh.	Eg.
9	4	28		II.	Oc.	Dis.
	7	29	36	II.	Ec.	Re.
	10	28		I.*	Oc.	Dis.
	12	51	49	I.*	Ec.	Re.
10	7	37		I.	Tr.	In.
	7	50		I.	Sh.	In.
	9	50		I.*	Tr.	Eg.
	10	4		I.*	Sh.	Eg.
	12	39		III.*	Oc.	Dis.
	15	35	4	III.	Ec.	Re.
	23	22		II.	Tr.	In.
	23	51		II.	Sh.	In.
11	2	0		II.	Tr.	Eg.
	2	31		II.	Sh.	Eg.
11	4	54		I.	Oc.	Dis.
	7	20	21	I.	Ec.	Re.
12	2	3		I.	Tr.	In.
	2	19		I.	Sh.	In.
	4	16		I.	Tr.	Eg.
	4	33		I.	Sh.	Eg.
	17	35		II.	Oc.	Dis.
	20	47	31	II.	Ec.	Re.
	23	20		I.	Oc.	Dis.
13	1	48	52	I.	Ec.	Re.
	20	29		I.	Tr.	In.
	20	48		I.	Sh.	In.
	22	42		I.	Tr.	Eg.
	23	1		I.	Sh.	Eg.
14	2	7		III.	Tr.	In.
	3	19		III.	Sh.	In.
	4	5		III.	Tr.	Eg.
	5	30		III.	Sh.	Eg.
	12	29		II.*	Tr.	In.
	13	8		II.*	Sh.	In.
	15	7		II.*	Tr.	Eg.
	15	48		II.	Sh.	Eg.
	17	46		I.	Oc.	Dis.
	20	17	28	I.	Ec.	Re.
15	14	55		I.*	Tr.	In.
	15	16		I.	Sh.	In.
	17	8		I.	Tr.	Eg.
	17	30		I.	Sh.	Eg.
16	6	44		II.	Oc.	Dis.
	10	6	24	II.*	Ec.	Re.
	12	12		I.*	Oc.	Dis.
	14	46	0	I.*	Ec.	Re.
17	9	21		I.*	Tr.	In.
	9	45		I.*	Sh.	In.
	11	34		I.*	Tr.	Eg.
	11	59		I.*	Sh.	Eg.
	15	57		III.	Oc.	Dis.
	19	35	15	III.	Ec.	Re.
18	1	37		II.	Tr.	In.
	2	25		II.	Sh.	In.
	4	15		II.	Tr.	Eg.
	5	5		II.	Sh.	Eg.
	6	38		I.	Oc.	Dis.
	9	14	33	I.*	Ec.	Re.
19	3	48		I.	Tr.	In.
	4	14		I.	Sh.	In.
	6	1		I.	Tr.	Eg.
	6	27		I.	Sh.	Eg.
	19	51		II.	Oc.	Dis.
	23	24	24	II.	Ec.	Re.
20	1	5		I.	Oc.	Dis.
	3	43	6	I.	Ec.	Re.
	22	14		I.	Tr.	In.
	22	42		I.	Sh.	In.
21	0	27		I.	Tr.	Eg.
	0	56		I.	Sh.	Eg.
	5	25		III.	Tr.	In.
	7	17		III.	Sh.	In.
	7	25		III.	Tr.	Eg.
21	9	30		III.*	Sh.	Eg.
	14	44		II.*	Tr.	In.
	15	42		II.	Sh.	In.
	17	23		II.	Tr.	Eg.
	18	23		II.	Sh.	Eg.
	19	31		I.	Oc.	Dis.
	22	11	43	I.	Ec.	Re.
22	16	40		I.	Tr.	In.
	17	11		I.	Sh.	In.
	18	53		I.	Tr.	Eg.
	19	25		I.	Sh.	Eg.
23	9	1		II.*	Oc.	Dis.
	12	43	26	II.*	Ec.	Re.
	13	57		I.*	Oc.	Dis.
	16	40	16	I.	Ec.	Re.
24	11	7		I.*	Tr.	In.
	11	40		I.*	Sh.	In.
	13	20		I.*	Tr.	Eg.
	13	54		I.*	Sh.	Eg.
	19	17		III.	Oc.	Dis.
	21	17		III.	Oc.	Re.
	21	33	48	III.	Ec.	Dis.
	23	34	54	III.	Ec.	Re.
25	3	52		II.	Tr.	In.
	5	0		II.	Sh.	In.
	6	31		II.	Tr.	Eg.
	7	40		II.	Sh.	Eg.
	8	23		I.*	Oc.	Dis.
	11	8	51	I.*	Ec.	Re.
26	5	33		I.	Tr.	In.
	6	8		I.	Sh.	In.
	7	46		I.	Tr.	Eg.
	8	22		I.*	Sh.	Eg.
	22	9		II.	Oc.	Dis.
27	2	1	32	II.	Ec.	Re.
	2	50		I.	Oc.	Dis.
	5	37	25	I.	Ec.	Re.
28	0	0		I.	Tr.	In.
	0	37		I.	Sh.	In.
	2	13		I.	Tr.	Eg.
	2	51		I.	Sh.	Eg.
	8	47		III.*	Tr.	In.
	10	48		III.*	Tr.	Eg.
	11	16		III.*	Sh.	In.
	13	30		III.*	Sh.	Eg.
	17	0		II.	Tr.	In.
	18	17		II.	Sh.	In.
	19	40		II.	Tr.	Eg.
	20	57		II.	Sh.	Eg.
	21	16		I.	Oc.	Dis.
29	0	6	3	I.	Ec.	Re.
	18	26		I.	Tr.	In.
	19	6		I.	Sh.	In.
	20	39		I.	Tr.	Eg.
	21	20		I.	Sh.	Eg.
30	11	19		II.*	Oc.	Dis.
	15	20	41	II.	Ec.	Re.
	15	42		I.	Oc.	Dis.
	18	34	38	I.	Ec.	Re.

NOTE.—*In.* denotes ingress; Eg., egress; Dis., disappearance; Re., reappearance; Ec., eclipse.
Oc. denotes occultation; Tr., transit of the satellite; Sh., transit of the shadow; * Visible at Washington.

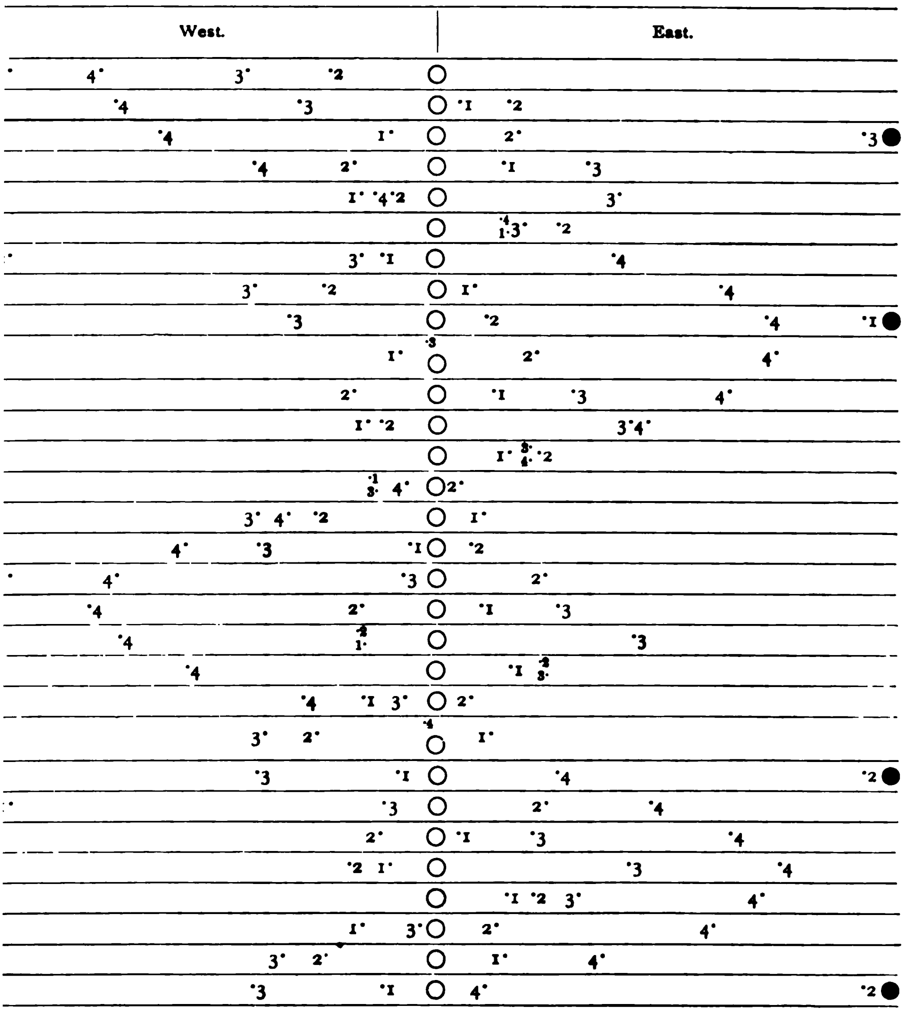
WASHINGTON MEAN TIME.

JUNE.

Phases of the Eclipses of the Satellites for an Inverting Telescope.



Configurations at 11h 30m for an Inverting Telescope.



WASHINGTON MEAN TIME.

JULY.

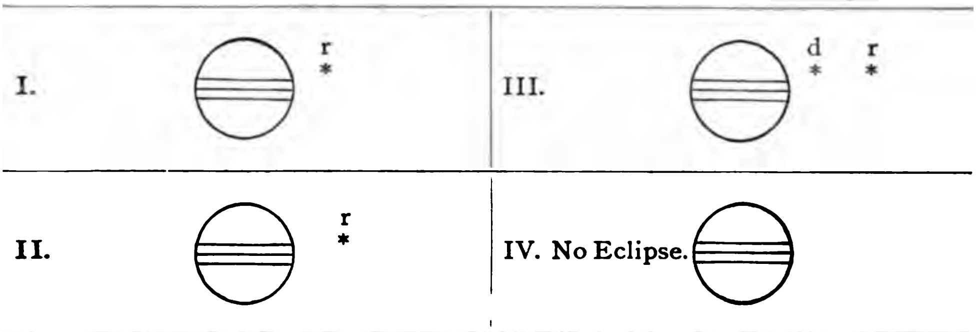
d	h	m	s			
1	12	53		I.*	Tr.	In.
	13	35		I.*	Sh.	In.
	15	6		I.	Tr.	Eg.
	15	48		I.	Sh.	Eg.
	22	39		III.	Oc.	Dis.
2	0	42		III.	Oc.	Re.
	1	32	14	III.	Ec.	Dis.
	3	34	40	III.	Ec.	Re.
	6	9		II.	Tr.	In.
	7	34		II.	Sh.	In.
	8	48		II.*	Tr.	Eg.
	10	9		I.*	Oc.	Dis.
	10	15		II.*	Sh.	Eg.
	13	3	15	I.*	Ec.	Re.
3	7	20		I.	Tr.	In.
	8	3		I.*	Sh.	In.
	9	33		I.*	Tr.	Eg.
	10	17		I.*	Sh.	Eg.
4	0	29		II.	Oc.	Dis.
	4	36		I.	Oc.	Dis.
	4	38	51	II.	Ec.	Re.
	7	31	50	I.	Ec.	Re.
5	1	46		I.	Tr.	In.
	2	32		I.	Sh.	In.
	4	0		I.	Tr.	Eg.
	4	46		I.	Sh.	Eg.
	12	11		III.*	Tr.	In.
	14	14		III.	Tr.	Eg.
	15	15		III.	Sh.	In.
	17	30		III.	Sh.	Eg.
	19	18		II.	Tr.	In.
	20	51		II.	Sh.	In.
	21	58		II.	Tr.	Eg.
	23	2		I.	Oc.	Dis.
	23	32		II.	Sh.	Eg.
6	2	0	30	I.	Ec.	Re.
	20	13		I.	Tr.	In.
	21	1		I.	Sh.	In.
	22	26		I.	Tr.	Eg.
	23	15		I.	Sh.	Eg.
7	13	40		II.	Oc.	Dis.
	17	29		I.	Oc.	Dis.
	17	58	7	II.	Ec.	Re.
	20	29	6	I.	Ec.	Re.
8	14	40		I.	Tr.	In.
	15	30		I.	Sh.	In.
	16	53		I.	Tr.	Eg.
	17	44		I.	Sh.	Eg.
9	2	4		III.	Oc.	Dis.
	4	9		III.	Oc.	Re.
	5	30	26	III.	Ec.	Dis.
	7	34	13	III.	Ec.	Re.
	8	28		II.*	Tr.	In.
	10	8		II.*	Sh.	In.
	11	8		II.*	Tr.	Eg.
	11	56		I.*	Oc.	Dis.
	12	49		II.*	Sh.	Eg.
	14	57	44	I.	Ec.	Re.
10	9	7		I.*	Tr.	In.
	9	58		I.*	Sh.	In.
	11	20		I.*	Tr.	Eg.
	12	12		I.*	Sh.	Eg.
11	2	50		II.	Oc.	Dis.
	6	22		I.	Oc.	Dis.
	7	16	21	II.	Ec.	Re.
11	9	26	20	I.*	Ec.	Re.
12	3	34		I.	Tr.	In.
	4	27		I.	Sh.	In.
	5	47		I.	Tr.	Eg.
	6	41		I.	Sh.	Eg.
	15	39		III.	Tr.	In.
	17	45		III.	Tr.	Eg.
	19	15		III.	Sh.	In.
	21	31		III.	Sh.	Eg.
	21	38		II.	Tr.	In.
	23	26		II.	Sh.	In.
13	0	18		II.	Tr.	Eg.
	0	49		I.	Oc.	Dis.
	2	6		II.	Sh.	Eg.
	3	55	1	I.	Ec.	Re.
	22	1		I.	Tr.	In.
	22	56		I.	Sh.	In.
14	0	14		I.	Tr.	Eg.
	1	10		I.	Sh.	Eg.
	16	2		II.	Oc.	Dis.
	19	16		I.	Oc.	Dis.
	20	35	42	II.	Ec.	Re.
	22	23	39	I.	Ec.	Re.
15	16	28		I.	Tr.	In.
	17	25		I.	Sh.	In.
	18	41		I.	Tr.	Eg.
	19	39		I.	Sh.	Eg.
16	5	33		III.	Oc.	Dis.
	7	40		III.	Oc.	Re.
	9	28	46	III.*	Ec.	Dis.
	10	48		II.*	Tr.	In.
	11	33	53	III.*	Ec.	Re.
	12	43		II.*	Sh.	In.
	13	28		II.	Tr.	Eg.
	13	43		I.	Oc.	Dis.
	15	24		II.	Sh.	Eg.
	16	52	18	I.	Ec.	Re.
17	10	55		I.*	Tr.	In.
	11	54		I.*	Sh.	In.
	13	9		I.	Tr.	Eg.
	14	8		I.	Sh.	Eg.
18	5	13		II.	Oc.	Dis.
	8	10		I.*	Oc.	Dis.
	9	54	0	II.*	Ec.	Re.
	11	20	55	I.*	Ec.	Re.
19	5	22		I.	Tr.	In.
	6	22		I.	Sh.	In.
	7	36		I.	Tr.	Eg.
	8	36		I.*	Sh.	Eg.
	19	11		III.	Tr.	In.
	21	19		III.	Tr.	Eg.
	23	14		III.	Sh.	In.
	23	59		II.	Tr.	In.
20	1	31		III.	Sh.	Eg.
	2	0		II.	Sh.	In.
	2	37		I.	Oc.	Dis.
	2	40		II.	Tr.	Eg.
	4	41		II.	Sh.	Eg.
	5	49	37	I.	Ec.	Re.
	23	50		I.	Tr.	In.
21	0	51		I.	Sh.	In.
	2	3		I.	Tr.	Eg.
	3	5		I.	Sh.	Eg.
	18	26		II.	Oc.	Dis.
	21	5		I.	Oc.	Dis.
21	23	13	26	II.	Ec.	Re.
22	0	18	16	I.	Ec.	Re.
	18	17		I.	Tr.	In.
	19	20		I.	Sh.	In.
	20	30		I.	Tr.	Eg.
	21	34		I.	Sh.	Eg.
23	9	8		III.*	Oc.	Dis.
	11	17		III.*	Oc.	Re.
	13	11		II.	Tr.	In.
	13	27	37	III.	Ec.	Dis.
	15	18		II.	Sh.	In.
	15	32		I.	Oc.	Dis.
	15	34	5	III.	Ec.	Re.
	15	51		II.	Tr.	Eg.
	17	58		II.	Sh.	Eg.
	18	46	56	I.	Ec.	Re.
24	12	45		I.	Tr.	In.
	13	49		I.	Sh.	In.
	14	58		I.	Tr.	Eg.
	16	3		I.	Sh.	Eg.
25	7	39		II.	Oc.	Dis.
	9	59		I.*	Oc.	Dis.
	12	31	46	II.	Ec.	Re.
	13	15	34	I.	Ec.	Re.
26	7	12		I.	Tr.	In.
	8	18		I.*	Sh.	In.
	9	25		I.*	Tr.	Eg.
	10	32		I.*	Sh.	Eg.
	22	48		III.	Tr.	In.
27	0	58		III.	Tr.	Eg.
	2	23		II.	Tr.	In.
	3	13		III.	Sh.	In.
	4	26		I.	Oc.	Dis.
	4	35		II.	Sh.	In.
	5	4		II.	Tr.	Eg.
	5	32		III.	Sh.	Eg.
	7	16		II.	Sh.	Eg.
	7	44	16	I.	Ec.	Re.
28	1	40		I.	Tr.	In.
	2	46		I.	Sh.	In.
	3	53		I.	Tr.	Eg.
	5	0		I.	Sh.	Eg.
	20	54		II.	Oc.	Dis.
	22	54		I.	Oc.	Dis.
29	1	51	15	II.	Ec.	Re.
	2	12	57	I.	Ec.	Re.
	20	7		I.	Tr.	In.
	21	15		I.	Sh.	In.
	22	21		I.	Tr.	Eg.
	23	29		I.	Sh.	Eg.
30	12	46		III.	Oc.	Dis.
	14	57		III.	Oc.	Re.
	15	36		II.	Tr.	In.
	17	22		I.	Oc.	Dis.
	17	26	28	III.	Ec.	Dis.
	17	52		II.	Sh.	In.
	18	16		II.	Tr.	Eg.
	19	34	15	III.	Ec.	Re.
	20	33		II.	Sh.	Eg.
	20	41	37	I.	Ec.	Re.
31	14	35		I.	Tr.	In.
	15	44		I.	Sh.	In.
	16	49		I.	Tr.	Eg.
	17	58		I.	Sh.	Eg.

Note.—In. **denotes ingress; Eg., egress; Dis., disappearance; Re., reappearance; Ec., eclipse.**
Oc. **denotes occultation; Tr., transit of the satellite; Sh., transit of the shadow; * Visible at Washing**

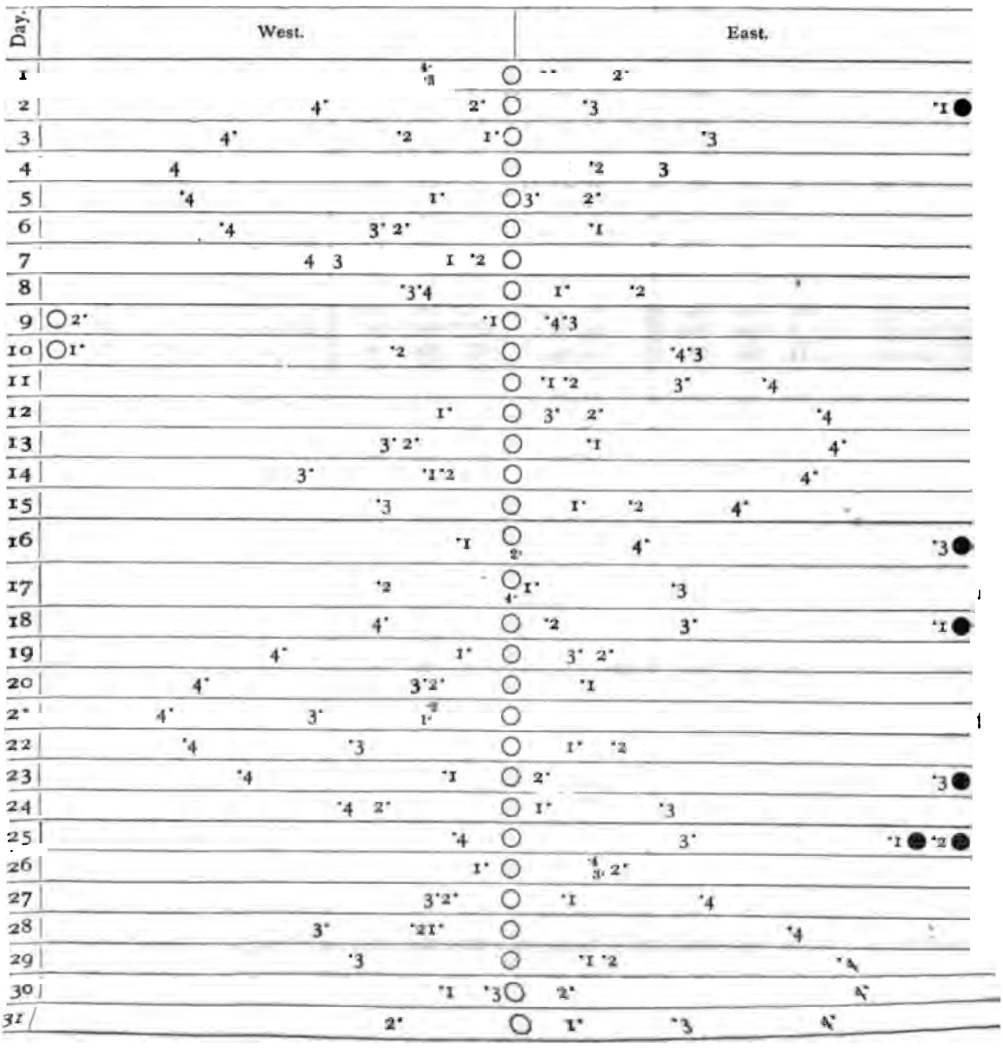
WASHINGTON MEAN TIME.

JULY

Phases of the Eclipses of the Satellites for an Inverting Telescope.



Configurations at 10h 30m for an Inverting Telescope.



WASHINGTON MEAN TIME.

AUGUST.

d	h	m	s			
1	10	8		II.*	Oc.	Dis.
	11	49		I.*	Oc.	Dis.
	15	9	37	II.	Ec.	Re.
	15	10	17	I.	Ec.	Re.
2	9	3		I.*	Tr.	In.
	10	13		I.*	Sh.	In.
	11	16		I.*	Tr.	Eg.
	12	27		I.	Sh.	Eg.
3	2	28		III.	Tr.	In.
	4	41		III.	Tr.	Eg.
	4	49		II.	Tr.	In.
	6	17		I.	Oc.	Dis.
	7	9		II.	Sh.	In.
	7	12		III.	Sh.	In.
	7	30		II.	Tr.	Eg.
	9	32		III.*	Sh.	Eg.
	9	39	0	I.*	Ec.	Re.
	9	51		II.*	Sh.	Eg.
4	3	31		I.	Tr.	In.
	4	42		I.	Sh.	In.
	5	44		I.	Tr.	Eg.
	6	56		I.	Sh.	Eg.
	23	23		II.	Oc.	Dis.
5	0	45		I.	Oc.	Dis.
	4	7	41	I.	Ec.	Re.
	4	29	9	II.	Ec.	Re.
	21	59		I.	Tr.	In.
	23	10		I.	Sh.	In.
6	0	12		I.	Tr.	Eg.
	1	25		I.	Sh.	Eg.
	16	29		III.	Oc.	Dis.
	18	4		II.	Tr.	In.
	18	43		III.	Oc.	Re.
	19	12		I.	Oc.	Dis.
	20	27		II.	Sh.	In.
	20	44		II.	Tr.	Eg.
	21	25	56	III.	Ec.	Dis.
	22	36	22	I.	Ec.	Re.
	23	8		II.	Sh.	Eg.
	23	35	4	III.	Ec.	Re.
7	16	27		I.	Tr.	In.
	17	39		I.	Sh.	In.
	18	41		I.	Tr.	Eg.
	19	54		I.	Sh.	Eg.
8	12	38		II.	Oc.	Dis.
	13	40		I.	Oc.	Dis.
	17	5	2	I.	Ec.	Re.
	17	47	33	II.	Ec.	Re.
9	10	55		I.*	Tr.	In.
	12	8		I.	Sh.	In.
	13	9		I.	Tr.	Eg.
	14	22		I.	Sh.	Eg.
10	6	14		III.	Tr.	In.
	7	18		II.	Tr.	In.
	8	8		I.*	Oc.	Dis.
	8	28		III.*	Tr.	Eg.
	9	44		II.*	Sh.	In.
	9	59		II.*	Tr.	Eg.
	11	11		III.*	Sh.	In.
	11	33	46	I.	Ec.	Re.
	12	26		II.	Sh.	Eg.
	13	32		III.	Sh.	Eg.
11	5	23		I.	Tr.	In.
	6	37		I.	Sh.	In.
	7	37		I.*	Tr.	Eg.

d	h	m	s			
11	8	51		I.*	Sh.	Eg.
12	1	55		II.	Oc.	Dis.
	2	36		I.	Oc.	Dis.
	6	2	28	I.	Ec.	Re.
	7	7	5	II.	Ec.	Re.
	23	51		I.	Tr.	In.
13	1	6		I.	Sh.	In.
	2	5		I.	Tr.	Eg.
	3	20		I.	Sh.	Eg.
	20	17		III.	Oc.	Dis.
	20	33		II.	Tr.	In.
	21	4		I.	Oc.	Dis.
	22	33		III.	Oc.	Re.
	23	2		II.	Sh.	In.
	23	14		II.	Tr.	Eg.
14	0	31	10	I.	Ec.	Re.
	1	24	49	III.	Ec.	Dis.
	1	43		II.	Sh.	Eg.
	3	35	18	III.	Ec.	Re.
	18	20		I.	Tr.	In.
	19	35		I.	Sh.	In.
	20	33		I.	Tr.	Eg.
	21	49		I.	Sh.	Eg.
15	15	11		II.	Oc.	Dis.
	15	32		I.	Oc.	Dis.
	18	59	51	I.	Ec.	Re.
	20	25	31	II.	Ec.	Re.
16	12	48		I.	Tr.	In.
	14	4		I.	Sh.	In.
	15	2		I.	Tr.	Eg.
	16	18		I.	Sh.	Eg.
17	9	48		II.*	Tr.	In.
	10	1		I.*	Oc.	Dis.
	10	4		III.*	Tr.	In.
	12	19		II.	Sh.	In.
	12	21		III.	Tr.	Eg.
	12	30		II.	Tr.	Eg.
	13	28	34	I.	Ec.	Re.
	15	0		II.	Sh.	Eg.
	15	10		III.	Sh.	In.
	17	33		III.	Sh.	Eg.
18	7	16		I.	Tr.	In.
	8	32		I.*	Sh.	In.
	9	30		I.*	Tr.	Eg.
	10	47		I.	Sh.	Eg.
19	4	29		II.	Oc.	Dis.
	4	29		I.	Oc.	Dis.
	7	57	17	I.*	Ec.	Re.
	9	45	3	II.*	Ec.	Re.
20	1	45		I.	Tr.	In.
	3	1		I.	Sh.	In.
	3	59		I.	Tr.	Eg.
	5	16		I.	Sh.	Eg.
	22	57		I.	Oc.	Dis.
	23	4		II.	Tr.	In.
21	0	8		III.	Oc.	Dis.
	1	36		II.	Sh.	In.
	1	46		II.	Tr.	Eg.
	2	25	59	I.	Ec.	Re.
	2	26		III.	Oc.	Re.
	4	18		II.	Sh.	Eg.
	5	23	43	III.	Ec.	Dis.
	7	35	33	III.*	Ec.	Re.
	20	13		I.	Tr.	In.

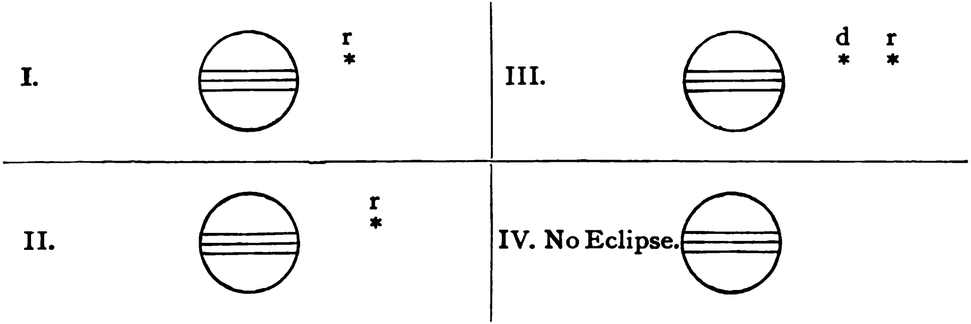
d	h	m	s			
21	21	30		I.	Sh.	In.
	22	27		I.	Tr.	Eg.
	23	45		I.	Sh.	Eg.
22	17	26		I.	Oc.	Dis.
	17	46		II.	Oc.	Dis.
	20	54	41	I.	Ec.	Re.
	23	3	29	II.	Ec.	Re.
23	14	42		I.	Tr.	In.
	15	59		I.	Sh.	In.
	16	56		I.	Tr.	Eg.
	18	13		I.	Sh.	Eg.
24	11	54		I.	Oc.	Dis.
	12	21		II.	Tr.	In.
	13	58		III.	Tr.	In.
	14	54		II.	Sh.	In.
	15	2		II.	Tr.	Eg.
	15	23	25	I.	Ec.	Re.
	16	17		III.	Tr.	Eg.
	17	35		II.	Sh.	Eg.
	19	10		III.	Sh.	In.
	21	34		III.	Sh.	Eg.
25	9	11		I.*	Tr.	In.
	10	28		I.	Sh.	In.
	11	25		I.	Tr.	Eg.
	12	42		I.	Sh.	Eg.
26	6	23		I.	Oc.	Dis.
	7	5		II.	Oc.	Dis.
	9	52	8	I.*	Ec.	Re.
	12	23	0	II.	Ec.	Re.
27	3	40		I.	Tr.	In.
	4	57		I.	Sh.	In.
	5	54		I.	Tr.	Eg.
	7	11		I.*	Sh.	Eg.
28	0	52		I.	Oc.	Dis.
	1	38		II.	Tr.	In.
	4	4		III.	Oc.	Dis.
	4	11		II.	Sh.	In.
	4	19		II.	Tr.	Eg.
	4	20	50	I.	Ec.	Re.
	6	24		III.	Oc.	Re.
	6	53		II.	Sh.	Eg
	9	22	21	III.*	Ec.	Dis.
	11	35	32	III.	Ec.	Re
	22	8		I.	Tr.	In
	23	26		I.	Sh.	In
29	0	22		I.	Tr.	Eg
	1	40		I.	Sh.	Eg.
	19	20		I.	Oc.	Dis.
	20	23		II.	Oc.	Dis.
	22	49	33	I.	Ec.	Re.
30	1	41	25	II.	Ec.	Re.
	16	37		I.	Tr.	In.
	17	54		I.	Sh.	In.
	18	51		I.	Tr.	Eg.
	20	9		I.	Sh.	Eg.
31	13	49		I.	Oc.	Dis
	14	55		II.	Tr.	In
	17	18	16	I.	Ec.	Re
	17	29		II.	Sh.	In.
	17	37		II.	Tr.	Eg.
	17	58		III.	Tr.	In.
	20	10		II.	Sh.	Eg.
	20	18		III.	Tr.	Eg.
	23	10		III.	Sh.	In.

ote.—*In.* denotes ingress; Eg., egress; Dis., disappearance; Re., reappearance; Ec., eclipse. *Oc.* denotes occultation; Tr., transit of the satellite; Sh., transit of the shadow; * **Visible at Washington.**

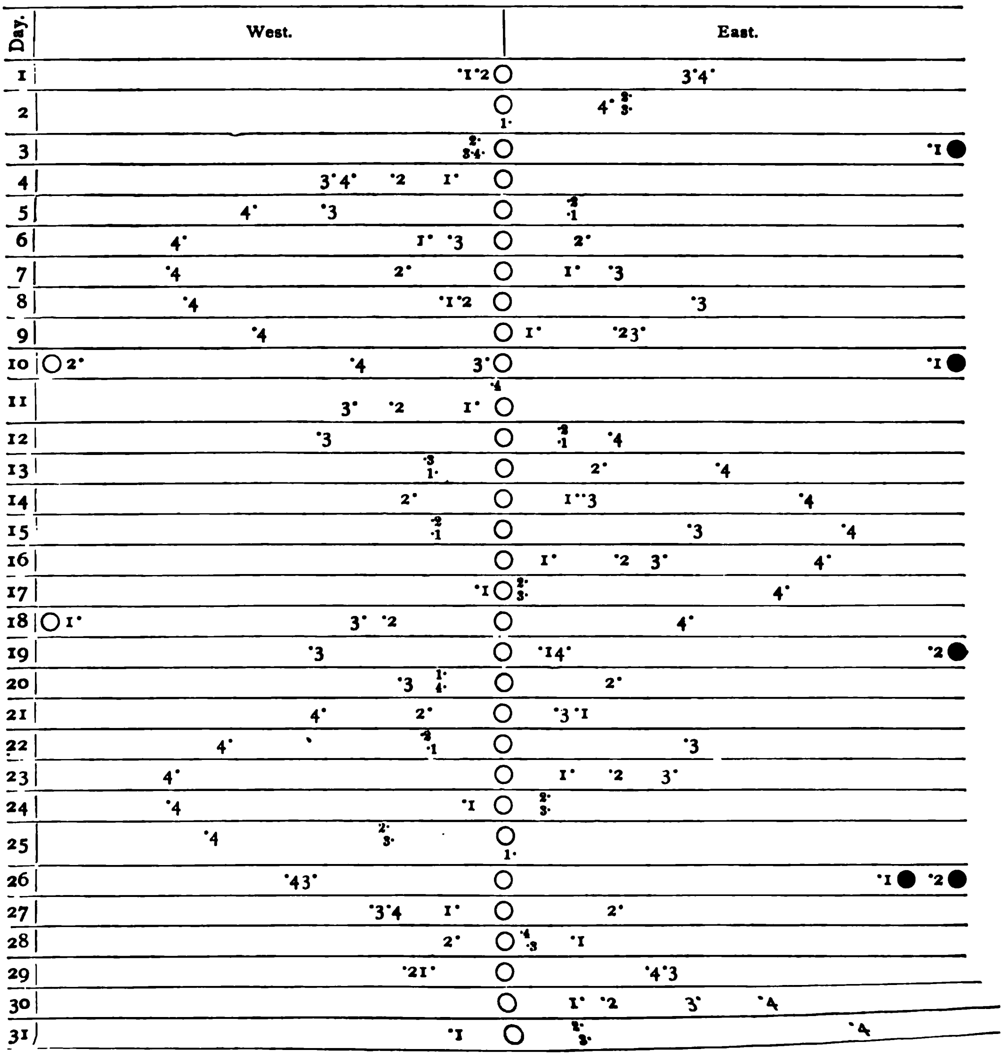
WASHINGTON MEAN TIME.

AUGUST.

Phases of the Eclipses of the Satellites for an Inverting Telescope.



Configurations at 9h 0m for an Inverting Telescope.



WASHINGTON MEAN TIME.

SEPTEMBER.

d	h	m	s			
1	1	35		III.	Sh.	Eg.
	11	6		I.	Tr.	In.
	12	23		I.	Sh.	In.
	13	20		I.	Tr.	Eg.
	14	38		I.	Sh.	Eg.
2	8	18		I.*	Oc.	Dis.
	9	43		II.*	Oc.	Dis.
	11	47	0	I.	Ec.	Re.
	15	0	54	II.	Ec.	Re.
3	5	35		I.	Tr.	In.
	6	52		I.	Sh.	In.
	7	49		I.*	Tr.	Eg.
	9	7		I.*	Sh.	Eg.
4	2	47		I.	Oc.	Dis.
	4	13		II.	Tr.	In.
	6	15	43	I.	Ec.	Re.
	6	46		II.	Sh.	In.
	6	55		II.*	Tr.	Eg.
	8	4		III.*	Oc.	Dis.
	9	28		II.*	Sh.	Eg.
	10	26		III.	Oc.	Re.
	13	21	3	III.	Ec.	Dis.
	15	35	35	III.	Ec.	Re.
5	0	4		I.	Tr.	In.
	1	21		I.	Sh.	In.
	2	18		I.	Tr.	Eg.
	3	36		I.	Sh.	Eg.
	21	16		I.	Oc.	Dis.
	23	2		II.	Oc.	Dis.
6	0	44	26	I.	Ec.	Re.
	4	19	19	II.	Ec.	Re.
	18	33		I.	Tr.	In.
	19	50		I.	Sh.	In.
	20	47		I.	Tr.	Eg.
	22	4		I.	Sh.	Eg.
7	15	44		I.	Oc.	Dis.
	17	32		II.	Tr.	In.
	19	13	9	I.	Ec.	Re.
	20	4		II.	Sh.	In.
	20	14		II.	Tr.	Eg.
	22	0		III.	Tr.	In.
	22	46		II.	Sh.	Eg.
8	0	22		III.	Tr.	Eg.
	3	9		III.	Sh.	In.
	5	36		III.	Sh.	Eg.
	13	2		I.	Tr.	In.
	14	19		I.	Sh.	In.
	15	16		I.	Tr.	Eg.
	16	33		I.	Sh.	Eg.
9	10	14		I.	Oc.	Dis.
	12	22		II.	Oc.	Dis.
	13	41	54	I.	Ec.	Re.
	17	38	45	II.	Ec.	Re.
10	7	31		I.*	Tr.	In.
	8	47		I.*	Sh.	In.
	9	46		I.	Tr.	Eg.
	11	2		I.	Sh.	Eg.
11	4	43		I.	Oc.	Dis.
	6	50		II.*	Tr.	In.
	8	10	36	I.*	Ec.	Re.
	9	21		II.*	Sh.	In.
	9	33		II.	Tr.	Eg.
11	12	3		II.	Sh.	Eg.
	12	9		III.	Oc.	Dis.
	14	32		III.	Oc.	Re.
	17	20	14	III.	Ec.	Dis.
	19	36	7	III.	Ec.	Re.
12	2	1		I.	Tr.	In.
	3	16		I.	Sh.	In.
	4	15		I.	Tr.	Eg.
	5	31		I.	Sh.	Eg.
	23	12		I.	Oc.	Dis.
13	1	43		II.	Oc.	Dis.
	2	39	19	I.	Ec.	Re.
	6	57	8	II.*	Ec.	Re.
	20	30		I.	Tr.	In.
	21	45		I.	Sh.	In.
	22	44		I.	Tr.	Eg.
14	0	0		I.	Sh.	Eg.
	17	41		I.	Oc.	Dis.
	20	10		II.	Tr.	In.
	21	8	2	I.	Ec.	Re.
	22	39		II.	Sh.	In.
	22	52		II.	Tr.	Eg.
15	1	21		II.	Sh.	Eg.
	2	6		III.	Tr.	In.
	4	30		III.	Tr.	Eg.
	7	9		III.*	Sh.	In.
	9	36		III.	Sh.	Eg.
	14	59		I.	Tr.	In.
	16	14		I.	Sh.	In.
	17	14		I.	Tr.	Eg.
	18	29		I.	Sh.	Eg.
16	12	10		I.	Oc.	Dis.
	15	4		II.	Oc.	Dis.
	15	36	47	I.	Ec.	Re.
	20	16	30	II.	Ec.	Re.
17	9	29		I.	Tr.	In.
	10	43		I.	Sh.	In.
	11	43		I.	Tr.	Eg.
	12	57		I.	Sh.	Eg.
18	6	40		I.*	Oc.	Dis.
	9	30		II.	Tr.	In.
	10	5	29	I.	Ec.	Re.
	11	56		II.	Sh.	In.
	12	12		II.	Tr.	Eg.
	14	38		II.	Sh.	Eg.
	16	16		III.	Oc.	Dis.
	18	41		III.	Oc.	Re.
	21	19	18	III.	Ec.	Dis.
	23	36	31	III.	Ec.	Re.
19	3	58		I.	Tr.	In.
	5	12		I.	Sh.	In.
	6	13		I.	Tr.	Eg.
	7	26		I.*	Sh.	Eg.
20	1	9		I.	Oc.	Dis.
	4	25		II.	Oc.	Dis.
	4	34	12	I.	Ec.	Re.
	9	34	51	II.	Ec.	Re.
	22	28		I.	Tr.	In.
	23	40		I.	Sh.	In.
21	0	42		I.	Tr.	Eg.
	1	55		I.	Sh.	Eg.
21	19	38		I.	Oc.	Dis.
	22	50		II.	Tr.	In.
	23	2	56	I.	Ec.	Re.
22	1	14		II.	Sh.	In.
	1	32		II.	Tr.	Eg.
	3	56		II.	Sh.	Eg.
	6	16		III.	Tr.	In.
	8	41		III.*	Tr.	Eg.
	11	8		III.	Sh.	In.
	13	36		III.	Sh.	Eg.
	16	57		I.	Tr.	In.
	18	9		I.	Sh.	In.
	19	12		I.	Tr.	Eg.
	20	24		I.	Sh.	Eg.
23	14	8		I.	Oc.	Dis.
	17	31	40	I.	Ec.	Re.
	17	47		II.	Oc.	Dis.
	22	54	8	II.	Ec.	Re.
24	11	27		I.	Tr.	In.
	12	38		I.	Sh.	In.
	13	41		I.	Tr.	Eg.
	14	53		I.	Sh.	Eg.
25	8	37		I.	Oc.	Dis.
	12	0	22	I.	Ec.	Re.
	12	10		II.	Tr.	In.
	14	31		II.	Sh.	In.
	14	53		II.	Tr.	Eg.
	17	14		II.	Sh.	Eg.
	20	28		III.	Oc.	Dis.
	22	54		III.	Oc.	Re.
26	1	18	55	III.	Ec.	Dis.
	3	37	29	III.	Ec.	Re.
	5	56		I.	Tr.	In.
	7	7		I.*	Sh.	In.
	8	11		I.*	Tr.	Eg.
	9	22		I.	Sh.	Eg.
27	3	7		I.	Oc.	Dis.
	6	29	6	I.*	Ec.	Re.
	7	9		II.*	Oc.	Dis.
	12	12	27	II.	Ec.	Re.
28	0	26		I.	Tr.	In.
	1	36		I.	Sh.	In.
	2	41		I.	Tr.	Eg.
	3	51		I.	Sh.	Eg.
	21	36		I.	Oc.	Dis.
29	0	57	48	I.	Ec.	Re.
	1	31		II.	Tr.	In.
	3	49		II.	Sh.	In.
	4	14		II.	Tr.	Eg.
	6	31		II.*	Sh.	Eg.
	10	28		III.	Tr.	In.
	12	55		III.	Tr.	Eg.
	15	7		III.	Sh.	In.
	17	37		III.	Sh.	Eg
	18	56		I.	Tr.	In.
	20	5		I.	Sh.	In.
	21	10		I.	Tr.	Eg.
	22	19		I.	Sh.	Eg.
30	16	6		I.	Oc.	Dis.
	19	26	33	I.	Ec.	Re.
	20	32		II.	Oc.	Dis.

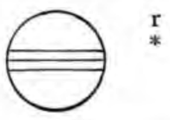
Note.—In. denotes ingress; Eg., egress; Dis., disappearance; Re., reappearance; Ec., eclipse. *Oc.* denotes occultation; Tr., transit of the satellite; Sh., transit of the shadow; * Visible at Washington.

WASHINGTON MEAN TIME.

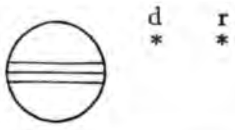
SEPTEMBER.

*Phases of the Eclipses of the Satellites for **an** Inverting Telescope.*

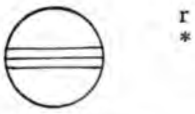
I.



III.



II.



IV. No Eclipse.

Configurations at $8^h\ 0^m$ for an Inverting Telescope.

Day.	West.		East.
1	2· 3·	○	1· ·4
2	3· ·2	·1 ○	4·
3	·3 1·	○	·2 4·
4	2·	.3 ○	·1 4·
5	·2	○	4 ·3
6	4·	○	·2·1 3·
7	4· ·1	○	2·3·
8	4· 2· 3·	○	1·
9	4· 3· ·2 ·1	○	
10	○ ·4 ·3	○	·2
11	○2· ·4 ·3	○	·1 ●
12	·4 ·2 1·	○	·3
13	·4	○	·2 ·1 ·3
14	1·	○	·4 2· 3·
15	2· 3·	○	1· ·4
16	3· ·2·1	○	·4
17	·3	○	1· ·2 ·4
18	·3	○	2· 4· ·1 ●
19	2· 1·	○	·3 4·
20		○	·1 ·34· ·2 ●
21	1·	○	2·4·3·
22	○3· 2·	○ 4·	1·
23	3· 4· ·2 ·1	○	
24	4· ·3	○	1· ·2
25	4 3 1	○	2
26	○1· 4· 2·	○	·3
27	·4	○	·1 ·3 ·2 ●
28	·4 1·	○	2· 3·
29	·4 2·	○	3· ·1
30	3· ·2 ·1·4	○	

PITER'S SATELLITES, 1912.

WASHINGTON MEAN TIME.

OCTOBER.

d	h	m	s				d	h	m	s				d	h	m	s			
1	1	31	38	II.	Ec.	Re.	**11**	12	41		II.	Oc.	Dis.	**22**	1	11	6	I.	Ec.	Re.
	13	26		I.	Tr.	In.		17	27	12	II.	Ec.	Re.		4	52		II.	Oc.	Dis.
	14	33		I.	Sh.	In.	**12**	4	25		I.	Tr.	In.		9	23	8	II.	Ec.	Re.
	15	40		I.	Tr.	Eg.		5	26		I.	Sh.	In.		19	25		I.	Tr.	In.
	16	48		I.	Sh.	Eg.		6	40		I.*	Tr.	Eg.		20	19		I.	Sh.	In.
2	10	36		I.	Oc.	Dis.		7	41		I.	Sh.	Eg.		21	40		I.	Tr.	Eg.
	13	55	15	I.	Ec.	Re.	**13**	1	34		I.	Oc.	Dis.		22	34		I.	Sh.	Eg.
	14	52		II.	Tr.	In.		4	47	32	I.	Ec.	Re.	**23**	16	34		I.	Oc.	Dis.
	17	6		II.	Sh.	In.		6	58		II.*	Tr.	In.		19	39	46	I.	Ec.	Re.
	17	35		II.	Tr.	Eg.		9	0		II.	Sh.	In.		23	8		II.	Tr.	In.
	19	49		II.	Sh.	Eg.		9	42		II.	Tr.	Eg.	**24**	0	53		II.	Sh.	In.
3	0	41		III.	Oc.	Dis.		11	42		II.	Sh.	Eg.		1	51		II.	Tr.	Eg.
	3	10		III.	Oc.	Re.		19	2		III.	Tr.	In.		3	36		II.	Sh.	Eg.
	5	17	54	III.	Ec.	Dis.		21	32		III.	Tr.	Eg.		13	37		III.	Oc.	Dis.
	7	37	48	III.*	Ec.	Re.		22	55		I.	Tr.	In.		13	55		I.	Tr.	In.
	7	56		I.*	Tr.	In.		23	5		III.	Sh.	In.		14	48		I.	Sh.	In.
	9	2		I.	Sh.	In.		23	55		I.	Sh.	In.		16	10		I.	Tr.	Eg.
	10	10		I.	Tr.	Eg.	**14**	1	10		I.	Tr.	Eg.		16	10		III.	Oc.	Re.
	11	17		I.	Sh.	Eg.		1	38		III.	Sh.	Eg.		17	2		I.	Sh.	Eg.
4	5	5		I.	Oc.	Dis.		2	10		I.	Sh.	Eg.		17	14	5	III.	Ec.	Dis.
	8	23	58	I.	Ec.	Re.		20	4		I.	Oc.	Dis.		19	38	0	III.	Ec.	Re.
	9	54		II.	Oc.	Dis.		23	16	17	I.	Ec.	Re.	**25**	11	4		I.	Oc.	Dis.
	14	49	54	II.	Ec.	Re.	**15**	2	4		II.	Oc.	Dis.		14	8	29	I.	Ec.	Re.
5	2	25		I.	Tr.	In.		6	46	10	II.*	Ec.	Re.		18	16		II.	Oc.	Dis.
	3	31		I.	Sh.	In.		17	25		I.	Tr.	In.		22	41	14	II.	Ec.	Re.
	4	40		I.	Tr.	Eg.		18	24		I.	Sh.	In.	**26**	8	25		I.	Tr.	In.
	5	46		I.	Sh.	Eg.		19	40		I.	Tr.	Eg.		9	16		I.	Sh.	In.
	23	35		I.	Oc.	Dis.		20	39		I.	Sh.	Eg.		10	40		I.	Tr.	Eg.
6	2	52	40	I.	Ec.	Re.	**16**	14	34		I.	Oc.	Dis.		11	31		I.	Sh.	Eg.
	4	14		II.	Tr.	In.		17	44	58	I.	Ec.	Re.	**27**	5	34		I.	Oc.	Dis.
	6	24		II.*	Sh.	In.		20	21		II.	Tr.	In.		8	37	9	I.	Ec.	Re.
	6	57		II.*	Tr.	Eg.		22	17		II.	Sh.	In.		12	31		II.	Tr.	In.
	9	7		II.	Sh.	Eg.		23	4		II.	Tr.	Eg.		14	11		II.	Sh.	In.
	14	43		III.	Tr.	In.	**17**	1	0		II.	Sh.	Eg.		15	14		II.	Tr.	Eg.
	17	12		III.	Tr.	Eg.		9	16		III.	Oc.	Dis.		16	54		II.	Sh.	Eg.
	19	6		III.	Sh.	In.		11	48		III.	Oc.	Re.	**28**	2	55		I.	Tr.	In.
	20	55		I.	Tr.	In.		11	55		I.	Tr.	In.		3	44		III.	Tr.	In.
	21	37		III.	Sh.	Eg.		12	52		I.	Sh.	In.		3	45		I.	Sh.	In.
	22	0		I.	Sh.	In.		13	15	25	III.	Ec.	Dis.		5	10		I.	Tr.	Eg.
	23	10		I.	Tr.	Eg.		14	10		I.	Tr.	Eg.		6	0		I.*	Sh.	Eg.
7	0	15		I.	Sh.	Eg.		15	7		I.	Sh.	Eg.		6	18		III.*	Tr.	Eg.
	18	5		I.	Oc.	Dis.		15	38	0	III.	Ec.	Re.		7	4		III.	Sh.	In.
	21	21	26	I.	Ec.	Re.	**18**	9	4		I.	Oc.	Dis.		9	39		III.	Sh.	Eg.
	23	18		II.	Oc.	Dis.		12	13	40	I.	Ec.	Re.	**29**	0	4		I.	Oc.	Dis.
8	4	8	59	II.	Ec.	Re.		15	28		II.	Oc.	Dis.		3	5	54	I.	Ec.	Re.
	15	25		I.	Tr.	In.		20	4	19	II.	Ec.	Re.		7	41		II.	Oc.	Dis.
	16	29		I.	Sh.	In.	**19**	6	25		I.*	Tr.	In.		11	59	55	II.	Ec.	Re.
	17	40		I.	Tr.	Eg.		7	21		I.	Sh.	In.		21	26		I.	Tr.	In.
	18	43		I.	Sh.	Eg.		8	40		I.	Tr.	Eg.		22	14		I.	Sh.	In.
9	12	35		I.	Oc.	Dis.		9	36		I.	Sh.	Eg.		23	41		I.	Tr.	Eg.
	15	50	7	I.	Ec.	Re.	**20**	3	34		I.	Oc.	Dis.	**30**	0	29		I.	Sh.	Eg.
	17	36		II.	Tr.	In.		6	42	22	I.*	Ec.	Re.		18	35		I.	Oc.	Dis.
	19	42		II.	Sh.	In.		9	44		II.	Tr.	In.		21	34	34	I.	Ec.	Re.
	20	19		II.	Tr.	Eg.		11	35		II.	Sh.	In.	**31**	1	54		II.	Tr.	In.
	22	24		II.	Sh.	Eg.		12	27		II.	Tr.	Eg.		3	28		II.	Sh.	In.
10	4	58		III.	Oc.	Dis.		14	18		II.	Sh.	Eg.		4	38		II.	Tr.	Eg.
	7	28		III.*	Oc.	Re.		23	22		III.	Tr.	In.		6	12		II.*	Sh.	Eg.
	9	16	48	III.	Ec.	Dis.	**21**	0	55		I.	Tr.	In.		15	56		I.	Tr.	In.
	9	55		I.	Tr.	In.		1	50		I.	Sh.	In.		16	42		I.	Sh.	In.
	10	57		I.	Sh.	In.		1	54		III.	Tr.	Eg.		18	0		III.	Oc.	Dis.
	11	38	3	III.	Ec.	Re.		3	5		III.	Sh.	In.		18	11		I.	Tr.	Eg.
	12	10		I.	Tr.	Eg.		3	10		I.	Tr.	Eg.		18	57		I.	Sh.	Eg.
	13	12		I.	Sh.	Eg.		4	5		I.	Sh.	Eg.		20	35		III.	Oc.	Re.
11	7	4		I.*	Oc.	Dis.		5	39		III.	Sh.	Eg.		21	13	11	III.	Ec.	Dis.
	10	18	50	I.	Ec.	Re.		22	4		I.	Oc.	Dis.		23	38	26	III.	Ec.	Re.

NOTE.—In. denotes ingress; Eg., egress; Dis., disappearance; Re., reappearance; Ec., eclipse.
***Oc.* denotes occultation; Tr., transit of the satellite; Sh., transit of the shadow; * Visible at Washington.**

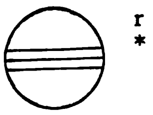
JUPITER'S SATELLITES, 1912.

WASHINGTON MEAN TIME.

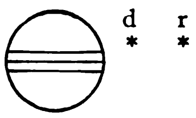
OCTOBER.

Phases of the Eclipses of the Satellites for an Inverting Telescope.

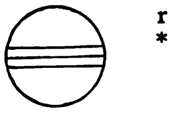
I.



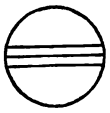
III.



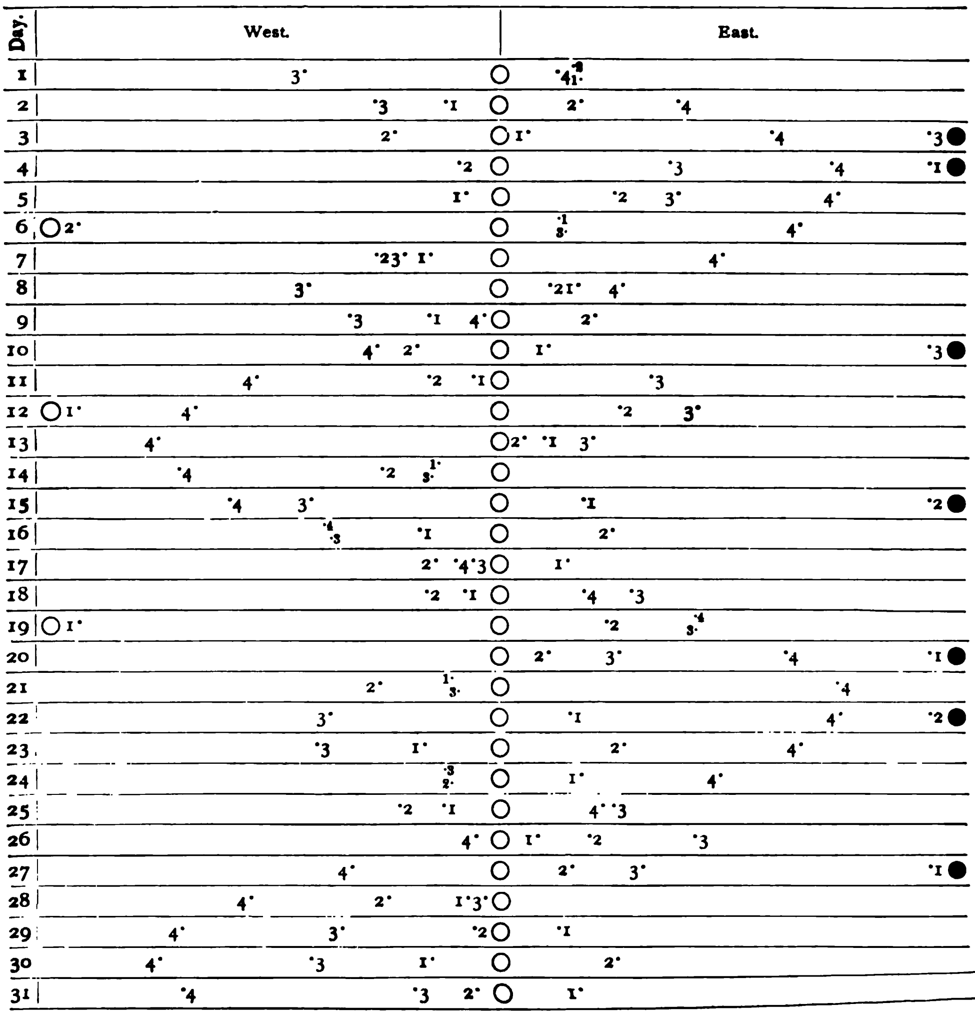
II.



IV. No Eclipse.



Configurations at $6^h\ 30^m$ for an Inverting Telescope.



Day.	West.		East.
1	3·	O	·4 ·2 1·
2	·3 ·1	O	2· ·4
3	2·	O	1· ·4 ·3 ●
4	·2	O	·3 ·4 ·1 ●
5	1·	O	·2 3· 4·
6	O 2·	O	·1 3· 4·
7	·2 3· 1·	O	4·
8	3·	O	·2 1· 4·
9	·3 ·1 4·	O	2·
10	4· 2·	O	1· ·3 ●
11	4· ·2 ·1	O	·3
12	O 1· 4·	O	·2 3·
13	4·	O	2· ·1 3·
14	·4 ·2 1· 3·	O	
15	·4 3·	O	·1 ·2 ●
16	·4 ·3 ·1	O	2·
17	2· ·4 ·3	O	1·
18	·2 ·1	O	·4 ·3
19	O 1·	O	·2 ·4 3·
20		O	2· 3· ·4 ·1 ●
21	2· 1· 3·	O	·4
22	3·	O	·1 4· ·2 ●
23	·3 1·	O	2· 4·
24	·3 2·	O	1· 4·
25	·2 ·1	O	4· ·3
26	4·	O	1· ·2 ·3
27	4·	O	2· 3· ·1 ●
28	4· 2· 1· 3·	O	
29	4· 3· ·2	O	·1
30	4· ·3 1·	O	2·
31	·4 ·3 2·	O	1·

PITER'S SATELLITES, 1912.

WASHINGTON MEAN TIME.

NOVEMBER.

d	h	m	s				d	h	m	s				d	h	m	s			
				I.		Dis.	7	20	52		I.	Sh.	Eg.	14	10	15		II.	Tr.	Eg.
						Re.		22	25		III.	Oc.	Dis.		11	23		II.	Sh.	Eg.
						Dis.	8	1	1		III.	Oc.	Re.		19	58		I.	Tr.	In.
						Re.		1	12	6	III.	Ec.	Dis.		20	32		I.	Sh.	In.
						In.		3	38	41	III.	Ec.	Re.		22	13		I.	Tr.	Eg.
				I.		In.		15	6		I.	Oc.	Dis.		22	47		I.	Sh.	Eg.
				I.		Eg.		17	58	1	I.	Ec.	Re.	15	2	51		III.	Oc.	Dis.
				I.		Eg.		23	54		II.	Oc.	Dis.		7	39	25	III.	Ec.	Re.
				I.	Oc.	Dis.	9	3	54	26	II.	Ec.	Re.		17	7		I.	Oc.	Dis.
			55	I.	Ec.	Re.		12	27		I.	Tr.	In.		19	52	43	I.	Ec.	Re.
				II.	Tr.	In.		13	6		I.	Sh.	In.	16	2	44		II.	Oc.	Dis.
				II.	Sh.	In.		14	42				Eg.		6	30	42	II.	Ec.	Re.
				II.	Tr.	Eg.		15	21				Eg.		14	29		I.	Tr.	In.
				II.	Sh.	Eg.	10	9	36				Dis.		15	0		I.	Sh.	In.
				I.	Tr.	In.		12	26				Re.		16	44		I.	Tr.	Eg.
				I.*	Sh.	In.		18	7				In.		17	16		I.	Sh.	Eg.
				I.	Tr.	Eg.		19	22				In.	17	11	37		I.	Oc.	Dis.
				I.	Sh.	Eg.		20	50				Eg.		14	21	21	I.	Ec.	Re.
				III.	Tr.	In.		22	5				Eg.		20	56		II.	Tr.	In.
				III.	Tr.	Eg.	11	6	58				In.		21	58		II.	Sh.	In.
				III.	Sh.	In.		7	35				In.		23	40		II.	Tr.	Eg.
				III.	Sh.	Eg.		9	13				Eg.	18	0	41		II.	Sh.	Eg.
				I.	Oc.	Dis.		9	50		I.		Eg.		8	59		I.	Tr.	In.
			10	I.	Ec.	Re.		12	33		III.		In.		9	29		I.	Sh.	In.
				II.	Oc.	Dis.		15	2		III.		In.		11	14		I.	Tr.	Eg.
		36	29	II.	Ec.	Re.		15	10		III.	Tr.	Eg.		11	44		I.	Sh.	Eg.
	23	27		I.	Tr.	In.		17	39		III.	Sh.	Eg.		16	59		III.	Tr.	In.
6	0	8		I.	Sh.	In.	12	4	6		I.	Oc.	Dis.		19	0		III.	Sh.	In.
	1	42		I.	Tr.	Eg.		6	55	23	I.	Ec.	Re.		19	38		III.	Tr.	Eg.
	2	24		I.	Sh.	Eg.		13	19		II.	Oc.	Dis.		21	39		III.	Sh.	Eg.
	20	36		I.	Oc.	Dis.		17	12	50	II.	Ec.	Re.	19	6	8		I.	Oc.	Dis.
	23	29	19	I.	Ec.	Re.	13	1	28		I.	Tr.	In.		8	50	4	I.	Ec.	Re.
7	4	42		II.	Tr.	In.		2	3		I.	Sh.	In.		16	10		II.	Oc.	Dis.
	6	4		II.*	Sh.	In.		3	43		I.	Tr.	Eg.		19	48	58	II.	Ec.	Re.
	7	26		II.	Tr.	Eg.		4	18		I.	Sh.	Eg.	20	3	29		I.	Tr.	In.
	8	47		II.	Sh.	Eg.		22	37		I.	Oc.	Dis.		3	58		I.	Sh.	In.
	17	57		I.	Tr.	In.	14	1	24	1	I.	Ec.	Re.		5	45		I.	Tr.	Eg.
	18	37		I.	Sh.	In.		7	31		II.	Tr.	In.		6	13		I.	Sh.	Eg.
	20	12		I.	Tr.	Eg.		8	40		II.	Sh.	In.							

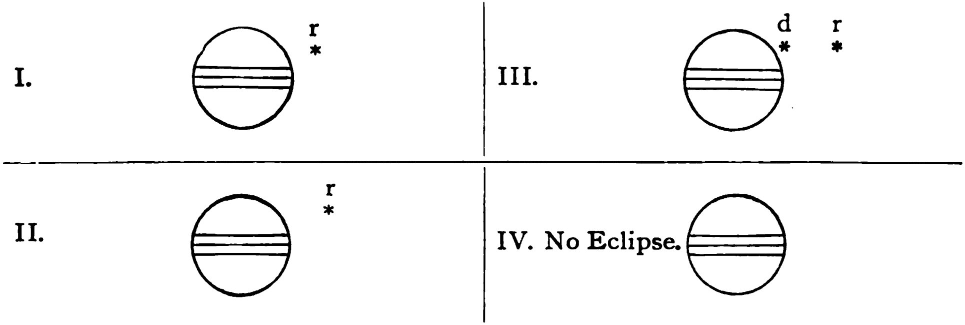
By reason of the proximity of JUPITER to the SUN the phenomena of the satellites are not given after November 20 for the remainder of the year.

NOTE.—In. denotes ingress; Eg., egress; Dis., disappearance; Re., reappearance; Ec., eclipse.
Oc. denotes occultation; Tr., transit of the satellite; Sh., transit of the shadow; * Visible at Washington.

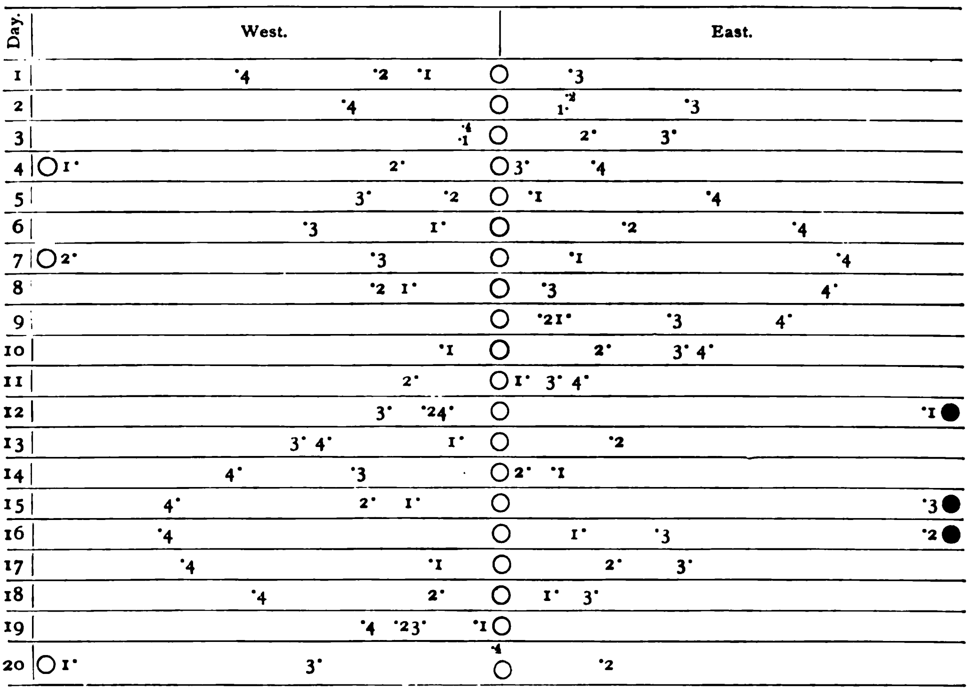
WASHINGTON MEAN TIME.

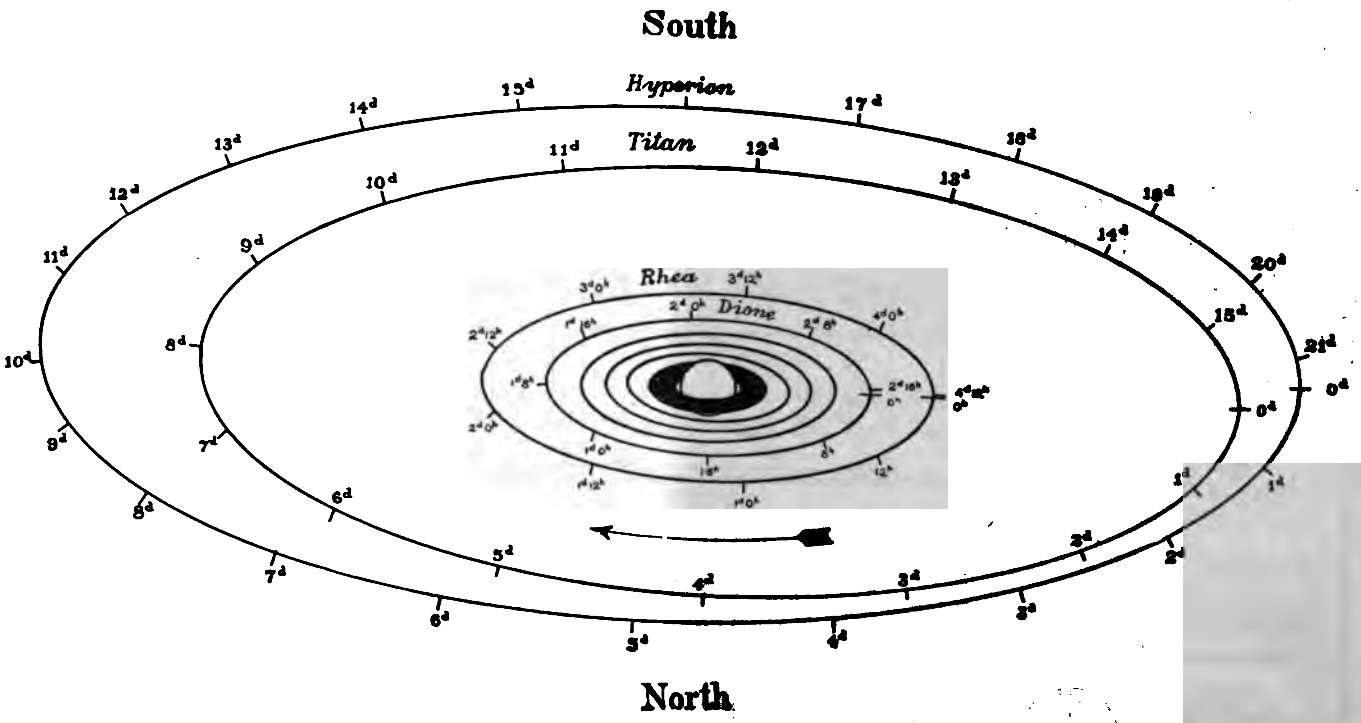
NOVEMBER.

Phases of the Eclipses of the Satellites for an Inverting Telescope.



Configurations at 5^h 30^m for an Inverting Telescope.





NAMES OF THE SATELLITES.

I. Mimas.
II. Enceladus.
III. Tethys.
IV. Dione.
V. Rhea.
VI. Titan.
VII. Hyperion.
VIII. Iapetus.
IX. Phœbe

APPARENT ORBITS OF THE SEVEN ***INNER SATELLITES OF SATURN,***

AT DATE OF OPPOSITION, ***NOVEMBER 23, 1912,***

AS SEEN IN AN ***INVERTING TELESCOPE.***

MEAN SYNODIC PERIODS.

	d	h
I.	0	22.6
II.	1	8.9
III.	1	21.3
IV.	2	17.7
V.	4	12.5
VI.	15	23.3
VII.	21	7.6
VIII.	[illegible]	[illegible]

[Eph 12]

WASHINGTON MEAN TIME OF GREATEST ELONGATION, ETC.

In the diagram on the preceding page, the points of the orbits marked "*o*" are ose of the eastern elongation, as seen in an inverting telescope. The times of ese elongations may be found from the following tables, and the apparent osition of a satellite at any other time may be marked on the diagram by etting off on the proper orbit the elapsed interval in days and hours since the st eastern elongation. The orbits of the five inner satellites are regarded as ircular, and the time of any elongation not given in the tables may be readily und from those given by adding or subtracting the proper multiple of the ean synodic period. Mimas can be seen only within a few hours of each longation, and the time of every elongation visible at Washington is given. or the three outer satellites the eccentricity is taken into account, and the mes both of the elongations and of the conjunctions are given. The following bbreviations are used in the tables:

E., East Elongation. I., Inferior Conjunction (north of planet).
W., West Elongation. S., Superior Conjunction (south of planet.)

MIMAS.

Greatest Elongations Visible at Washington.

d h	d h	d h	d h	d h	d h
ın. 1 12.1 W.	Feb. 5 9.0 W.	Sept. 27 13.3 E.	Oct. 24 10.0 W.	Nov. 17 10.5 E.	Dec. 10 12.6 W.
2 10.7 W.	6 7.6 W.	28 12.0 E.	25 8.6 W.	18 9.1 E.	11 11.2 W.
3 9.3 W.	12 10.7 E.	29 10.6 E.	27 17.0 E.	19 7.7 E.	12 9.8 W.
4 7.9 W.	13 9.3 E.	30 9.2 E.	28 15.6 E.	20 6.3 E.	13 8.4 W.
5 6.5 W.	14 7.9 E.	Oct. 3 16.4 W.	29 14.2 E.	21 16.3 W.	14 7.0 W.
9 12.3 E.	15 6.5 E.	4 15.1 W.	30 12.8 E.	22 14.9 W.	15 5.6 W.
10 10.9 E.	. . . .	5 13.7 W.	31 11.4 E.	23 13.5 W.	16 15.5 E.
11 9.6 E.	Sept. 1 15.5 W.	6 12.3 W.	Nov. 1 10.0 E.	24 12.1 W.	17 14.1 E.
12 8.2 E.	2 14.1 W.	7 10.9 W.	2 8.6 E.	25 10.8 W.	18 12.7 E.
13 6.8 E.	3 12.7 W.	8 9.5 W.	3 7.3 E.	26 9.4 W.	19 11.3 E.
17 12.6 W.	4 11.4 W.	11 16.6 E.	4 17.3 W.	27 8.0 W.	20 10.0 E.
18 11.2 W.	9 15.6 E.	12 15.2 E.	5 15.9 W.	28 6.6 W.	21 8.6 E.
19 9.8 W.	10 14.3 E.	13 13.8 E.	6 14.5 W.	29 16.4 E.	22 7.2 E.
20 8.4 W.	11 12.9 E.	14 12.4 E.	7 13.1 W.	30 15.0 E.	23 5.8 E.
21 7.0 W.	12 11.5 E.	15 11.0 E.	8 11.7 W.	Dec. 1 13.7 E.	24 15.8 W.
26 11.5 E.	17 16.0 W.	16 9.7 E.	9 10.3 W.	2 12.3 E.	25 14.4 W.
27 10.1 E.	18 14.6 W.	17 8.3 E.	10 9.0 W.	3 10.9 E.	26 13.0 W.
28 8.7 E.	19 13.2 W.	19 16.9 W.	11 7.6 W.	4 9.5 E.	27 11.6 W.
29 7.4 E.	20 11.9 W.	20 15.5 W.	13 16.0 E.	5 8.1 E.	28 10.2 W.
30 6.0 E.	21 10.5 W.	21 14.1 W.	14 14.6 E.	6 6.7 E.	29 8.8 W.
eb. 3 11.7 W.	25 16.1 E.	22 12.7 W.	15 13.2 E.	8 15.3 W.	30 7.4 W.
4 10.3 W.	26 14.7 E.	23 11.4 W.	16 11.8 E.	9 13.9 W.	31 6.0 W.

ENCELADUS.

d h	d h	d h	d h	d h	d h
an. 2 7.5 E.	Jan. 16 0.4 E.	Jan. 29 17.3 E.	Feb. 12 10.2 E.	Feb. 26 3.2 E.	Aug. 18 5.3 E.
3 16.4 E.	17 9.3 E.	31 2.2 E.	13 19.1 E.	27 12.1 E.	19 14.2 E.
5 1.3 E.	18 18.2 E.	Feb. 1 11.0 E.	15 4.0 E.	28 21.0 E.	20 23.1 E.
6 10.2 E.	20 3.1 E.	2 19.9 E.	16 12.9 E.	. . . .	22 8.0 E.
7 19.1 E.	21 11.9 E.	4 4.8 E.	17 21.8 E.	Aug. 10 0.0 E.	23 16.9 E.
9 4.0 E.	22 20.8 E.	5 13.7 E.	19 6.7 E.	11 8.9 E.	25 1.8 E.
10 12.8 E.	24 5.7 E.	6 22.6 E.	20 15.6 E.	12 17.8 E.	26 10.7 E.
11 21.7 E.	25 14.6 E.	8 7.5 E.	22 0.5 E.	14 2.7 E.	27 19.5 E.
13 6.6 E.	26 23.5 E.	9 16.4 E.	23 9.4 E.	15 11.6 E.	29 4.4 E
14 15.5 E.	28 8.4 E.	11 1.3 E.	24 18.3 E.	16 20.4 E.	30 13.3

WASHINGTON MEAN TIME OF GREATEST ELONGATION.

ENCELADUS—(*Concluded*).

d h	d h	d h	d h	d h	d h	d h
Aug. 31 22.2 E.	Sept. 21 11.5 E.	Oct. 12 0.7 E.	Nov. 1 13.8 E.	Nov. 22 2.9 E.	Dec. 12 16.0 E.	
Sept. 2 7.1 E.	22 20.3 E.	13 9.5 E.	2 22.7 E.	23 11.8 E.	14 0.8 E.	
3 16.0 E.	24 5.2 E.	14 18.4 E.	4 7.5 E.	24 20.6 E.	15 9.7 E.	
5 0.9 E.	25 14.1 E.	16 3.3 E.	5 16.4 E.	26 5.5 E.	16 18.6 E.	
6 9.7 E.	26 23.0 E.	17 12.2 E.	7 1.3 E.	27 14.4 E.	18 3.5 E.	
7 18.6 E.	28 7.9 E.	18 21.0 E.	8 10.2 E.	28 23.3 E.	19 12.4 E.	
9 3.5 E.	29 16.7 E.	20 5.9 E.	9 19.0 E.	30 8.1 E.	20 21.3 E.	
10 12.4 E.	Oct. 1 1.6 E.	21 14.8 E.	11 3.9 E.	Dec. 1 17.0 E.	22 6.2 E.	
11 21.3 E.	2 10.5 E.	22 23.6 E.	12 12.8 E.	3 1.9 E.	23 15.0 E.	
13 6.2 E.	3 19.4 E.	24 8.5 E.	13 21.6 E.	4 10.8 E.	24 23.9 E.	
14 15.0 E.	5 4.3 E.	25 17.4 E.	15 6.5 E.	5 19.6 E.	26 8.8 E.	
15 23.9 E.	6 13.1 E.	27 2.3 E.	16 15.4 E.	7 4.5 E.	27 17.7 E.	
17 8.8 E.	7 22.0 E.	28 11.1 E.	18 0.3 E.	8 13.4 E.	29 2.6 E.	
18 17.7 E.	9 6.9 E.	29 20.0 E.	19 9.1 E.	9 22.2 E.	30 11.4 E.	
20 2.6 E.	10 15.8 E.	31 4.9 E.	20 18.0 E.	11 7.1 E.	31 20.3 E.	

TETHYS.

d h	d h	d h	d h	d h	d h	d h
Jan. 2 0.7 E.	Feb. 6 21.6 E.	Aug. 11 21.6 E.	Sept. 16 18.5 E.	Oct. 22 15.2 E.	Nov. 27 11.6 E.	
3 22.0 E.	8 19.0 E.	13 18.9 E.	18 15.8 E.	24 12.5 E.	29 8.9 E.	
5 19.3 E.	10 16.3 E.	15 16.3 E.	20 13.1 E.	26 9.7 E.	Dec. 1 6.2 E.	
7 16.6 E.	12 13.6 E.	17 13.6 E.	22 10.4 E.	28 7.0 E.	3 3.5 E.	
9 13.9 E.	14 10.9 E.	19 10.9 E.	24 7.7 E.	30 4.3 E.	5 0.8 E.	
11 11.2 E.	16 8.2 E.	21 8.2 E.	26 5.0 E.	Nov. 1 1.6 E.	6 22.0 E.	
13 8.5 E.	18 5.6 E.	23 5.5 E.	28 2.3 E.	2 22.9 E.	8 19.3 E.	
15 5.8 E.	20 2.9 E.	25 2.8 E.	29 23.6 E.	4 20.2 E.	10 16.6 E.	
17 3.2 E.	22 0.2 E.	27 0.1 E.	Oct. 1 20.9 E.	6 17.5 E.	12 13.9 E.	
19 0.5 E.	23 21.6 E.	28 21.5 E.	3 18.2 E.	8 14.8 E.	14 11.2 E.	
20 21.8 E.	25 18.9 E.	30 18.8 E.	5 15.5 E.	10 12.0 E.	16 8.5 E.	
22 19.1 E.	27 16.2 E.	Sept. 1 16.1 E.	7 12.8 E.	12 9.3 E.	18 5.8 E.	
24 16.4 E.	29 13.6 E.	3 13.4 E.	9 10.1 E.	14 6.6 E.	20 3.1 E.	
26 13.7 E.	Mar. 2 10.9 E.	5 10.7 E.	11 7.4 E.	16 3.9 E.	22 0.4 E.	
28 11.0 E.	4 8.2 E.	7 8.0 E.	13 4.7 E.	18 1.2 E.	23 21.7 E.	
30 8.4 E.	. . . .	9 5.3 E.	15 2.0 E.	19 22.5 E.	25 19.0 E.	
Feb. 1 5.7 E.	Aug. 6 5.7 E.	11 2.6 E.	16 23.3 E.	21 19.8 E.	27 16.3 E.	
3 3.0 E.	8 3.0 E.	12 23.9 E.	18 20.6 E.	23 17.0 E.	29 13.6 E.	
5 0.3 E.	10 0.3 E.	14 21.2 E.	20 17.9 E.	25 14.3 E.	31 10.8 E.	

DIONE.

d h	d h	d h	d h	d h	d h
Jan. 1 21.9 E.	Feb. 6 11.9 E.	Aug. 13 12.0 E.	Sept. 18 2.0 E.	Oct. 23 15.7 E.	Nov. 28 5.0 E.
4 15.5 E.	9 5.6 E.	16 5.7 E.	20 19.7 E.	26 9.3 E.	30 22.7 E.
7 9.2 E.	11 23.3 E.	18 23.4 E.	23 13.4 E.	29 3.0 E.	Dec. 3 16.3 E.
10 2.9 E.	14 17.1 E.	21 17.1 E.	26 7.1 E.	31 20.6 E.	6 10.0 E.
12 20.6 E.	17 10.8 E.	24 10.8 E.	29 0.7 E.	Nov. 3 14.2 E.	9 3.6 E.
15 14.3 E.	20 4.5 E.	27 4.5 E.	Oct. 1 18.4 E.	6 7.9 E.	11 21.2 E.
18 8.0 E.	22 22.2 E.	29 22.2 E.	4 12.1 E.	9 1.5 E.	14 14.9 E.
21 1.7 E.	25 16.0 E.	Sept. 1 15.9 E.	7 5.7 E.	11 19.2 E.	17 8.6 E.
23 19.4 E.	28 9.7 E.	4 9.6 E.	9 23.4 E.	14 12.8 E.	20 2.2 E.
26 13.1 E.	Mar. 2 3.4 E.	7 3.3 E.	12 17.0 E.	17 6.5 E.	22 19.9 E.
29 6.8 E.	. . . .	9 21.0 E.	15 10.7 E.	20 0.1 E.	25 13.5 E.
Feb. 1 0.5 E.	Aug. 8 0.6 E.	12 14.7 E.	18 4.4 E.	22 17.7 E.	28 7.2 E.
3 18.2 E.	10 18.3 E.	15 8.4 E.	20 22.0 E.	25 11.4 E.	31 0.8 E.

WASHINGTON MEAN TIME OF GREATEST ELONGATION.

RHEA.				TITAN.				HYPERION.			
	d h		d h		d h		d h		d		d
Jan.	4 16.7 E.	Sept.	27 12.0 E.	Jan.	4 12.8 W.	Oct.	6 11.0 S.	Jan.	3.1 I.	Sept.	11.0 E.
	9 5.1 E.	Oct.	2 0.4 E.		8 9.8 S.		10 14.0 E.		8.1 W.		15.7 I.
	13 17.5 E.		6 12.8 E.		12 13.3 E.		14 15.0 I.		13.8 S.		21.2 W
	18 6.0 E.		11 1.1 E.		16 15.5 I.		18 11.0 W.		19.3 E.		27.3 S.
	22 18.4 E.		15 13.4 E.		20 11.4 W.		22 8.8 S.		24.3 I.	Oct.	2.3 E.
	27 6.9 E.		20 1.8 E.		24 8.6 S.		26 11.7 E.		29.3 W.		7.0 I.
	31 19.3 E.		24 14.1 E.		28 12.2 E.		30 12.6 I.	Feb.	4.0 S.		12.5 W
Feb.	5 7.8 E.		29 2.4 E.	Feb.	1 14.5 I.	Nov.	3 8.5 W.		9.5 E.		18.6 S.
	9 20.3 E.	Nov.	2 14.7 E.		5 10.6 W.		7 6.1 S.		14.5 I.		23.6 E.
	14 8.8 E.		7 3.0 E.		9 7.8 S.		11 9.0 E.		19.6 W.		28.3 I.
	18 21.3 E.		11 15.3 E.		13 11.6 E.		15 10.0 I.		25.3 S.	Nov.	2.8 W
	23 9.8 E.		16 3.6 E.		. . . .		19 5.7 W.	Mar.	1.8 E.		8.9 S.
	. . . .		20 15.9 E.	Aug.	27 19.4 I.		23 3.3 S.		6.8 I.		13.9 E.
Aug.	17 20.1 E.		25 4.2 E.		31 15.8 W.		27 6.2 E.		. . .		18.6 I.
	22 8.6 E.		29 16.5 E.	Sept.	4 14.0 S.	Dec.	1 7.2 I.	July	30.1 E.		24.1 W
	26 21.1 E.	Dec.	4 4.8 E.		8 17.2 E.		5 3.0 W.	Aug.	3.8 I.		30.1 S.
	31 9.5 E.		8 17.2 E.		12 18.5 I.		9 0.5 S.		9.3 W.	Dec.	5.2 E.
Sept.	4 22.0 E.		13 5.5 E.		16 14.7 W.		13 3.4 E.		15.4 S.		9.9 I.
	9 10.4 E.		17 17.8 E.		20 12.8 S.		17 4.6 I.		20.5 E.		15.4 W
	13 22.8 E.		22 6.1 E.		24 15.9 E.		21 0.4 W.		25.3 I.		21.3 S.
	18 11.2 E.		26 18.5 E.		28 17.0 I.		24 21.9 S.		30.8 W.		26.4 E.
	22 23.6 E.		31 6.8 E.	Oct.	2 13.1 W.		29 1.0 E.	Sept.	5.8 S.		31.1 I.

IAPETUS.

	d		d		d		d		d		d
Jan.	15.8 I.	Feb.	23.8 S.	Aug.	4.3 S.	Sept.	14.7 I.	Oct.	22.8 S.	Dec.	2.1 I.
Feb.	4.4 W.		. . .		24.9 E.	Oct.	4.0 W.	Nov.	11.8 E.		21.1 W

NINTH SATELLITE OF SATURN.

DIFFERENTIAL COORDINATES OF PHŒBE FOR 1912.

Washington Mean Noon.	$\alpha_{Ph.}-\alpha_{Sat.}$	$\delta_{Ph.}-\delta_{Sat.}$	Washington Mean Noon.	$\alpha_{Ph.}-\alpha_{Sat.}$	$\delta_{Ph.}-\delta_{Sat.}$	Washington Mean Noon.	$\alpha_{Ph.}-\alpha_{Sat.}$	$\delta_{Ph.}-\delta_{Sa}$
1912.	m s	° ′	1912.	m s	° ′	1912.	m s	° ′
Jan. 1	−1 0.1	−0 5.0	July 4	+0 45.7	+0 2.0	Oct. 2	+2 36.4	+0 9.
6	1 5.4	0 5.6	9	0 54.2	0 2.5	7	2 39.0	0 10.
11	1 10.5	0 6.2	14	1 2.6	0 3.1	12	2 41.2	0 10.
16	1 15.3	0 6.8	19	1 10.7	0 3.6	17	2 43.0	0 10.
21	1 19.7	0 7.4	24	1 18.6	0 4.2	22	2 44.4	0 11.
26	1 23.8	0 7.9	29	1 26.3	0 4.7	27	2 45.4	0 11.
31	1 27.5	0 8.3	Aug. 3	1 33.7	0 5.2	Nov. 1	2 45.9	0 11.
Feb. 5	1 30.8	0 8.6	8	1 40.8	0 5.7	6	2 46.0	0 11.
10	1 33.6	0 8.9	13	1 47.6	0 6.1	11	2 45.7	0 12.
15	1 35.9	0 9.1	18	1 54.2	0 6.5	16	2 45.0	0 12.
20	1 37.7	0 9.3	23	2 0.4	0 7.0	21	2 43.8	0 12.
25	1 39.0	0 9.5	28	2 6.3	0 7.4	26	2 42.2	0 12.
Mar. 1	1 39.8	0 9.6	Sept. 2	2 11.8	0 7.8	Dec. 1	2 40.2	0 12.
6	1 40.0	0 9.6	7	2 17.0	0 8.1	6	2 37.8	0 12.
11	1 39.6	0 9.6	12	2 21.7	0 8.5	11	2 34.9	0 12.
16	1 38.6	0 9.5	17	2 26.0	0 8.9	16	2 31.6	0 12.
21	1 36.9	0 9.3	22	2 29.9	0 9.3	21	2 28.0	0 12.
26	1 34.6	0 9.1	27	+2 33.4	+0 9.6	26	2 24.1	0 12.
31	−1 31.7	−0 8.8				31	+2 19.9	+0 11.

SATURN'S RINGS, 1912.

ELEMENTS FOR DETERMINING THE GEOCENTRIC POSITION, APPEARANCE, AND MAGNITUDE OF SATURN'S RINGS.

		a	*b*	*p*	*l*	*l'*	*u*	*u'*
Washington Mean Noon.		Outer Major Axis.	Outer Minor Axis.	Inclination of Northern Semi-minor Axis to Circle of Declination from North to East.	The Elevation of the Earth above the Plane of the Ring.	The Elevation of the Sun above the Plane of the Ring.	Earth's Longitude fr Saturn counted on Pl of Ring from the Rin Ascending Node on-	
							Equator.	Eclip
		″	″	° ′	° ′	° ′	° ′	°
Jan.	1	43.82	−15.32	−0 37.6	−20 27.5	−21 59.4	95 5.4	52
	11	43.09	15.06	0 36.2	20 27.3	22 5.2	94 54.0	52
	21	42.32	14.83	0 36.2	20 30.4	22 11.0	94 54.0	52
	31	41.55	14.63	0 37.6	20 36.6	22 16.7	95 5.6	52
Feb.	10	40.80	14.47	0 40.4	20 46.1	22 22.4	95 28.3	52
	20	40.09	−14.35	−0 44.6	−20 58.2	−22 28.1	96 1.6	53
Mar.	1	39.44	14.27	0 49.9	21 12.5	22 33.7	96 44.7	54
	11	38.85	14.23	0 56.3	21 28.7	22 39.2	97 36.7	55
	21	38.34	14.22	1 3.7	21 46.2	22 44.7	98 36.4	56
	31	37.91	14.25	1 12.0	22 4.6	22 50.2	99 42.7	57
Apr.	10	37.57	−14.31	−1 20.9	−22 23.5	−22 55.6	100 54.5	58
	20	37.31	14.40	1 30.4	22 42.4	23 0.9	102 10.7	59
	30	37.14	14.52	1 40.2	23 1.0	23 6.2	103 30.1	60
May	10	37.06	14.67	1 50.2	23 18.9	23 11.4	104 51.6	62
	20	37.07	14.84	2 0.3	23 35.9	23 16.6	106 14.0	63
	30	37.17	−15.03	−2 10.4	−23 51.7	−23 21.7	107 36.1	65
June	9	37.35	15.25	2 20.2	24 6.2	23 26.7	108 56.7	66
	19	37.62	15.49	2 29.7	24 19.1	23 31.7	110 14.8	67
	29	37.97	15.75	2 38.6	24 30.5	23 36.6	111 29.2	68
July	9	38.40	16.03	2 46.9	24 40.2	23 41.5	112 38.7	70
	19	38.91	−16.33	−2 54.4	−24 48.3	−23 46.3	113 42.0	71
	29	39.50	16.64	3 1.0	24 54.7	23 51.1	114 38.0	72
Aug.	8	40.15	16.96	3 6.6	24 59.4	23 55.9	115 25.5	72
	18	40.86	17.29	3 11.0	25 2.6	24 0.6	116 3.5	73
	28	41.60	17.63	3 14.2	25 4.2	24 5.2	116 31.1	73
Sept.	7	42.37	−17.96	−3 16.1	−25 4.4	−24 9.7	116 47.4	74
	17	43.15	18.27	3 16.6	25 3.2	24 14.2	116 52.1	74
	27	43.90	18.56	3 15.7	25 0.7	24 18.6	116 44.8	74
Oct.	7	44.61	18.82	3 13.4	24 57.0	24 23.0	116 25.7	73
	17	45.23	19.03	3 9.9	24 52.2	24 27.3	115 55.7	73
	27	45.74	−19.17	−3 5.3	−24 46.4	−24 31.6	115 16.5	72
Nov.	6	46.10	19.24	2 59.8	24 39.9	24 35.8	114 30.0	71
	16	46.31	19.24	2 53.7	24 32.9	24 39.9	113 38.7	71
	26	46.33	19.16	2 47.4	24 25.8	24 44.0	112 45.3	70
Dec.	6	46.18	19.02	2 41.1	24 19.0	24 48.0	111 52.9	69
	16	45.85	−18.81	−2 35.2	−24 13.1	−24 51.9	111 4.6	68
	26	45.38	18.56	2 30.4	24 8.6	24 55.8	110 23.0	67
	31	45.10	−18.42	−2 28.3	−24 6.9	−24 57.7	110 5.5	67

The factor to be multiplied by *a* and *b* to obtain the axes of—

The inner ellipse of the outer ring	= 0.8801,	log factor = 9.9445
The outer ellipse of the inner ring	= 0.8599,	log factor = 9.9344
The inner ellipse of the inner ring	= 0.6650,	log factor = 9.8228
The inner ellipse of the dusky ring	= 0.5486,	log factor = 9.7392

NOTE.—The positive sign of *l* indicates that the visible surface of the ring is the northern one.

FRACTIONS OF THE PERIODS OF REVOLUTION.

action of a evolution.	Mimas.	Enceladus.		Tethys.		Dione.		Rhea.		Titan.		Fraction of a Revolution.
	h	d	h	d	h	d	h	d	h	d	h	
0.00	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0.00
0.02	0.5	0	0.7	0	0.9	0	1.3	0	2.2	0	7.7	0.02
0.04	0.9	0	1.3	0	1.8	0	2.6	0	4.3	0	15.3	0.04
0.06	1.4	0	2.0	0	2.7	0	3.9	0	6.5	0	23.0	0.06
0.08	1.8	0	2.6	0	3.6	0	5.3	0	8.7	1	6.6	0.08
0.10	2.3	0	3.3	0	4.5	0	6.6	0	10.8	1	14.3	0.10
0.12	2.7	0	4.0	0	5.4	0	7.9	0	13.0	1	21.9	0.12
0.14	3.2	0	4.6	0	6.3	0	9.2	0	15.2	2	5.6	0.14
0.16	3.6	0	5.3	0	7.2	0	10.5	0	17.3	2	13.2	0.16
0.18	4.1	0	5.9	0	8.2	0	11.8	0	19.5	2	20.9	0.18
0.20	4.5	0	6.6	0	9.1	0	13.1	0	21.7	3	4.5	0.20
0.22	5.0	0	7.2	0	10.0	0	14.5	0	23.9	3	12.2	0.22
0.24	5.4	0	7.9	0	10.9	0	15.8	1	2.0	3	19.8	0.24
0.26	5.9	0	8.6	0	11.8	0	17.1	1	4.2	4	3.5	0.26
0.28	6.3	0	9.2	0	12.7	0	18.4	1	6.4	4	11.2	0.28
0.30	6.8	0	9.9	0	13.6	0	19.7	1	8.5	4	18.8	0.30
0.32	7.2	0	10.5	0	14.5	0	21.0	1	10.7	5	2.5	0.32
0.34	7.7	0	11.2	0	15.4	0	22.3	1	12.9	5	10.1	0.34
0.36	8.1	0	11.8	0	16.3	0	23.6	1	15.0	5	17.8	0.36
0.38	8.6	0	12.5	0	17.2	1	1.0	1	17.2	6	1.4	0.38
0.40	9.1	0	13.2	0	18.1	1	2.3	1	19.4	6	9.1	0.40
0.42	9.5	0	13.8	0	19.0	1	3.6	1	21.5	6	16.7	0.42
0.44	10.0	0	14.5	0	19.9	1	4.9	1	23.7	7	0.4	0.44
0.46	10.4	0	15.1	0	20.8	1	6.2	2	1.9	7	8.0	0.46
0.48	10.9	0	15.8	0	21.7	1	7.5	2	4.0	7	15.7	0.48
0.50	11.3	0	16.4	0	22.7	1	8.8	2	6.2	7	23.3	0.50
0.52	11.8	0	17.1	0	23.6	1	10.2	2	8.4	8	7.0	0.52
0.54	12.2	0	17.8	1	0.5	1	11.5	2	10.5	8	14.7	0.54
0.56	12.7	0	18.4	1	1.4	1	12.8	2	12.7	8	22.3	0.56
0.58	13.1	0	19.1	1	2.3	1	14.1	2	14.9	9	6.0	0.58
0.60	13.6	0	19.7	1	3.2	1	15.4	2	17.1	9	13.6	0.60
0.62	14.0	0	20.4	1	4.1	1	16.7	2	19.2	9	21.3	0.62
0.64	14.5	0	21.0	1	5.0	1	18.0	2	21.4	10	4.9	0.64
0.66	14.9	0	21.7	1	5.9	1	19.4	2	23.6	10	12.6	0.66
0.68	15.4	0	22.4	1	6.8	1	20.7	3	1.7	10	20.2	0.68
0.70	15.8	0	23.0	1	7.7	1	22.0	3	3.9	11	3.9	0.70
0.72	16.3	0	23.7	1	8.6	1	23.3	3	6.1	11	11.5	0.72
0.74	16.7	1	0.3	1	9.5	2	0.6	3	8.2	11	19.2	0.74
0.76	17.2	1	1.0	1	10.4	2	1.9	3	10.4	12	2.8	0.76
0.78	17.6	1	1.7	1	11.3	2	3.2	3	12.6	12	10.5	0.78
0.80	18.1	1	2.3	1	12.2	2	4.5	3	14.7	12	18.1	0.80
0.82	18.5	1	3.0	1	13.2	2	5.9	3	16.9	13	1.8	0.82
0.84	19.0	1	3.6	1	14.1	2	7.2	3	19.1	13	9.5	0.84
0.86	19.5	1	4.3	1	15.0	2	8.5	3	21.2	13	17.1	0.86
0.88	19.9	1	4.9	1	15.9	2	9.8	3	23.4	14	0.8	0.88
0.90	20.4	1	5.6	1	16.8	2	11.1	4	1.6	14	8.4	0.90
0.92	20.8	1	6.3	1	17.7	2	12.4	4	3.7	14	16.1	0.92
0.94	21.3	1	6.9	1	18.6	2	13.7	4	5.9	14	23.7	0.94
0.96	21.7	1	7.6	1	19.5	2	15.1	4	8.1	15	7.4	0.96
0.98	22.2	1	8.2	1	20.4	2	16.4	4	10.3	15	15.0	0.98
1.00	22.6	1	8.9	1	21.3	2	17.7	4	12.4	15	22.7	1.00

Six Inner Satellites of Saturn.			Hyperion.			Iapetus.		
Fraction of a Revolution.	p^1	F	Time from Eastern Elongation.	p^1	F	Time from Eastern Elongation.	p^1	F
	°		d	°		d	°	
0.00	87.1	1.000	0.0	87.8	0.940	0	75.2	1.026
0.02	84.1	0.994	0.5	83.9	0.918	2	72.9	1.016
0.04	81.0	0.974	1.0	79.6	0.872	4	70.4	0.985
0.06	77.7	0.942	1.5	74.8	0.809	6	67.7	0.933
0.08	74.2	0.899	2.0	69.1	0.731	8	64.7	0.863
0.10	70.2	0.845	2.5	61.8	0.639	10	61.0	0.774
0.12	65.7	0.783	3.0	52.0	0.541	12	56.3	0.673
0.14	60.4	0.713	3.5	37.8	0.450	14	49.9	0.562
0.16	53.8	0.641	4.0	17.6	0.385	16	40.1	0.449
0.18	45.6	0.569	4.5	353.3	0.370	18	24.2	0.346
0.20	35.0	0.504	5.0	330.5	0.410	20	358.3	0.284
0.22	21.7	0.451	5.5	313.3	0.491	22	326.3	0.287
0.24	5.7	0.420	6.0	301.5	0.590	24	301.2	0.355
0.26	348.5	0.420	6.5	293.1	0.690	26	287.5	0.467
0.28	332.5	0.451	7.0	286.8	0.783	28	278.4	0.578
0.30	319.2	0.504	7.5	281.8	0.865	30	272.2	0.686
0.32	308.6	0.569	8.0	277.6	0.933	32	267.6	0.783
0.34	300.4	0.641	8.5	273.9	0.987	34	264.1	0.863
0.36	293.8	0.713	9.0	270.5	1.025	36	261.0	0.923
0.38	288.5	0.783	9.5	267.3	1.045	38	258.2	0.962
0.40	283.9	0.845	10.0	264.2	1.047	40	255.6	0.975
0.42	280.0	0.899	10.5	261.1	1.033	42	253.0	0.964
0.44	276.5	0.942	11.0	257.9	1.004	44	250.3	0.930
0.46	273.2	0.974	11.5	254.4	0.962	46	247.4	0.871
0.48	270.1	0.994	12.0	250.5	0.908	48	243.9	0.792
0.50	267.1	1.000	12.5	246.0	0.843	50	239.3	0.697
0.52	264.1	0.994	13.0	240.8	0.771	52	233.3	0.589
0.54	261.0	0.974	13.5	234.4	0.693	54	224.4	0.470
0.56	257.7	0.942	14.0	226.4	0.613	56	210.5	0.357
0.58	254.2	0.899	14.5	216.1	0.542	58	185.1	0.282
0.60	250.2	0.845	15.0	203.1	0.484	60	151.4	0.277
0.62	245.7	0.783	15.5	187.1	0.448	62	124.8	0.343
0.64	240.4	0.713	16.0	169.7	0.443	64	108.8	0.452
0.66	233.8	0.641	16.5	153.1	0.471	66	99.2	0.571
0.68	225.6	0.569	17.0	139.3	0.525	68	92.9	0.684
0.70	215.0	0.504	17.5	128.2	0.594	70	88.4	0.785
0.72	201.7	0.451	18.0	119.6	0.668	72	84.8	0.873
0.74	185.7	0.420	18.5	112.8	0.741	74	81.8	0.944
0.76	168.5	0.420	19.0	107.1	0.809	76	79.2	0.993
0.78	152.5	0.451	19.5	102.2	0.866	78	76.7	1.019
0.80	139.2	0.504	20.0	97.9	0.909	80	74.1	1.023
0.82	128.6	0.569	20.5	93.9	0.935			
0.84	120.4	0.641	21.0	90.1	0.944			
0.86	113.8	0.713	21.5	86.4	0.933			
0.88	108.5	0.783						
0.90	103.9	0.845						
0.92	100.0	0.899						
0.94	96.5	0.942						
0.96	93.2	0.974						
0.98	90.1	0.994						
1.00	87.1	1.000						

The fraction of a revolution is reckoned from the Eastern Elongation.
Position angle of satellite $p = p' + (P - P_0)$.
Apparent distance of satellite $s = F\frac{a(\rho)}{\rho}$.

Date.	Mimas.		Enceladus.		Tethys.		Dione.	
	$P-P_0$	$\frac{a(\rho)}{\rho}$	$P-P_0$	$\frac{a(\rho)}{\rho}$	$P-P_0$	$\frac{a(\rho)}{\rho}$	$P-P_0$	$\frac{a(\rho)}{\rho}$
	°	″	°	″	°	″	°	″
an. 1	+0.6	29.8	+2.3	38.4	+3.1	47.5	+2.3	60.8
11	0.7	29.3	2.3	37.8	3.2	46.7	2.3	59.8
21	0.9	28.8	2.3	37.1	3.2	45.9	2.3	58.8
31	1.1	28.3	2.2	36.4	3.2	45.1	2.3	57.7
eb. 10	1.3	27.8	2.2	35.7	3.1	44.3	2.2	56.6
20	+1.5	27.3	+2.1	35.1	+3.1	43.5	+2.2	55.6
ar. 1	1.7	26.8	+2.1	34.5	3.1	42.8	+2.1	54.7
ug. 8	+0.3	27.4	−0.2	35.2	+0.9	43.6	−0.2	55.7
18	−0.1	27.8	0.3	35.8	0.8	44.3	0.3	56.7
28	0.5	28.3	0.3	36.4	0.7	45.1	0.3	57.7
ept. 7	0.9	28.8	0.4	37.1	0.7	45.9	0.3	58.7
17	1.2	29.4	0.4	37.8	0.6	46.7	0.3	59.8
27	−1.4	29.9	−0.3	38.4	+0.6	47.5	−0.3	60.8
ct. 7	1.6	30.3	0.3	39.0	0.6	48.3	0.3	61.8
17	1.7	30.7	0.2	39.5	0.7	49.0	0.2	62.6
27	1.8	31.1	0.2	40.0	0.7	49.6	0.2	63.4
ov. 6	1.8	31.3	−0.1	40.3	0.8	49.9	−0.1	63.8
16	−1.7	31.5	0.0	40.5	+0.9	50.1	0.0	64.1
26	1.6	31.5	+0.1	40.5	1.0	50.1	+0.1	64.1
ec. 6	1.5	31.4	0.2	40.4	1.1	50.0	0.2	64.0
16	1.3	31.2	0.3	40.1	1.1	49.6	0.3	63.6
26	−1.1	30.9	+0.4	39.7	+1.2	49.2	+0.4	63.0

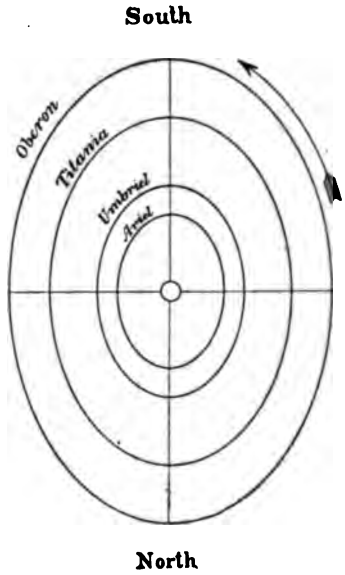
Date.	Rhea.		Titan.		Hyperion.		Iapetus.	
	$P-P_0$	$\frac{a(\rho)}{\rho}$	$P-P_0$	$\frac{a(\rho)}{\rho}$	$P-P_0$	$\frac{a(\rho)}{\rho}$	$P-P_0$	$\frac{a(\rho)}{\rho}$
	°	″	°	″	°	″	°	″
n. 1	+2.4	85.1	+2.1	197	+2.0	239	+0.1	574
11	2.4	83.7	2.1	194	2.0	235	0.1	564
21	2.4	82.2	2.1	190	2.0	231	0.1	554
31	2.4	80.7	2.1	186	1.9	227	0.1	544
eb. 10	2.4	79.2	2.1	183	1.9	223	+0.1	534
20	+2.3	77.9	+2.0	180	+1.8	219	0.0	525
ar. 1	2.2	76.7	+1.9	177	+1.8	215	0.0	516
ug. 8	+0.1	78.0	−0.2	180	−0.3	219	+0.1	525
18	0.0	79.3	0.3	184	0.3	223	0.1	535
28	−0.1	80.7	0.3	187	0.4	227	0.2	544
ept. 7	0.1	82.2	0.3	190	0.4	231	0.2	554
17	0.1	83.8	0.3	194	0.4	235	0.2	564
27	−0.1	85.2	−0.3	197	−0.4	239	+0.2	574
ct. 7	0.0	86.5	0.3	200	0.4	243	0.2	583
17	0.0	87.6	0.3	203	0.3	246	0.1	592
27	+0.1	88.6	0.2	205	0.2	249	0.1	598
ov. 6	0.2	89.3	−0.1	207	0.2	251	+0.1	603
16	+0.3	89.7	0.0	208	−0.1	252	0.0	606
26	0.4	89.7	+0.1	208	0.0	253	0.0	606
ec. 6	0.5	89.5	0.2	207	+0.1	252	0.0	604
16	0.6	88.9	0.3	206	0.2	250	0.0	600
26	+0.7	88.1	+0.4	204	+0.3	248	0.0	594

SATELLITES OF URANUS, 1912.

APPARENT ORBITS OF THE SATELLITES OF URANUS AT DATE OF OPPOSITION, JULY 24, 1912, AS SEEN IN AN INVERTING TELESCOPE.

Apparent Apsides.

Date.		Position Angle.	App. Distances. Ariel.	App. Distances. Umbriel.
		°	"	"
May	3.	357.6	13.5	18.8
July	22,	358.7	14.1	19.6
Oct.	10,	359.9	13.5	18.8



Apparent Apsides.

Date.		Position Angle.	App. Distances. Titania.	App. Distances. Oberon.
		°	"	"
May	3,	357.6	30.9	41.3
July	22,	358.7	32.2	43.1
Oct.	10,	359.9	30.9	41.3

WASHINGTON MEAN TIME OF GREATEST ELONGATION.

ARIEL.				UMBRIEL.				TITANIA.				OBERON.	
North.		South.		North.		South.		North.		South.		North and South	
	d h		d h		d h		d h		d h		d h		d h
May	2 7.7	May	6 2.5	May	2 7.1	May	4 8.9	Apr.	27 10.6	May	1 19.0	May	17 5 1 S
	9 21.2		13 15.9		10 14.0		12 15.8	May	6 3.5		10 12.0		23 22.6 N
	17 10.7		21 5.4		18 21.0		20 22.7		14 20.4		19 4.9		30 16.2 S.
	25 0.1		28 18.8		27 3.9		29 5.6		23 13.4		27 21.8	June	6 9.8 N
June	1 13.6	June	5 8.3	June	4 10.8	June	6 12.5	June	1 6.3	June	5 14.8		13 3.4 S
	9 3.0		12 21.8		12 17.7		14 19.4		9 23.3		14 7.7		19 21.0 N
	16 16.5		20 11.2		21 0.6		23 2.4		18 16.2		23 0.7		26 14.6 S
	24 6.0		28 0.7		29 7.5	July	1 9.3		27 9.2	July	1 17.7	July	3 8.2 N
July	1 19.4	July	5 14.2	July	7 14.5		9 16.2	July	6 2.2		10 10.7		10 1.8 S
	9 8.9		13 3.6		15 21.4		17 23.2		14 19.2		19 3.7		16 19.5 N
	16 22.4		20 17.1		24 4.4		26 6.1		23 12.2		27 20.7		23 13.1 S.
	24 11.9		28 6.6	Aug.	1 11.3	Aug.	3 13.1	Aug.	1 5.2	Aug.	5 13.7		30 6.7 N
Aug.	1 1.4	Aug.	4 20.1		9 18.3		11 20.0		9 22.2		14 6.7	Aug.	6 0.3 S.
	8 14.8		12 9.6		18 1.2		20 3.0		18 15.2		22 23.7		12 18.0 N
	16 4.3		19 23.1		26 8.2		28 9.9		27 8.2		31 16.7		19 11.6 S.
	23 17.8		27 12.6	Sept.	3 15.1	Sept.	5 16.9	Sept.	5 1.2	Sept.	9 9.7		26 5 2 N.
	31 7.3	Sept.	4 2.0		11 22.1		13 23.8		13 18.2		18 2.6	Sept.	1 22.8 S.
Sept.	7 20.8		11 15.5		20 5.0		22 6.8		22 11.2		26 19.6		8 16 4 N.
	15 10.3		19 5.0		28 12.0		30 13.7	Oct.	1 4.1	Oct.	5 12.6		15 10.1 S.
	22 23.8		26 18.5	Oct.	6 18.9	Oct.	8 20.6		9 21.1		14 5.6		22 3.7 N.
	30 13.3	Oct.	4 8.0		15 1.8		17 3.6		18 14.1		22 22.5		28 21 3 S.
Oct.	8 2.7		11 21.5		23 8.8		25 10.5		27 7.0		31 15.5	Oct.	5 14.8 N
	15 16.2		19 11.0		31 15.7	Nov.	2 17.4	Nov.	4 23.9	Nov.	9 8.4		12 8.4 S.
	23 5.7		27 0.4	Nov.	8 22.6		11 0.4		13 16.9		18 1.3		19 2.0 N.
	30 19.2	Nov.	3 13.9		17 5.6		19 7.3		22 9.8		26 18.2		25 19.5 S.

	d	h		d	h
Period of Ariel,	2	12.489	Period of Titania,	8	16.942
Period of Umbriel,	4	3.460	Period of Oberon,	13	11.119

NOTE.—For Ariel only every third elongation is given, and for Umbriel every alternate one. **The intermediate** *ones may be found by adding* multiples of the period of the satellite.

	Fractions of the Period of Revolution.										
raction of a Revolution.	Ariel.		Umbriel.		Titania.		Oberon.		Fraction of a Revolution.	p^1	F
	d	h	d	h	d	h	d	h		°	
0.00	0	0.0	0	0.0	0	0.0	0	0.0	0.00	178.8	1.000
0.02	0	1.2	0	2.0	0	4.2	0	6.5	0.02	183.8	0.995
0.04	0	2.4	0	4.0	0	8.4	0	12.9	0.04	189.0	0.984
0.06	0	3.6	0	6.0	0	12.5	0	19.4	0.06	194.3	0.964
0.08	0	4.8	0	8.0	0	16.7	1	1.8	0.08	199.8	0.939
0.10	0	6.0	0	10.0	0	20.9	1	8.3	0.10	205.7	0.908
0.12	0	7.3	0	11.9	1	1.1	1	14.8	0.12	212.1	0.873
0.14	0	8.5	0	13.9	1	5.3	1	21.2	0.14	218.9	0.834
0.16	0	9.7	0	15.9	1	9.4	2	3.7	0.16	226.5	0.796
0.18	0	10.9	0	17.9	1	13.6	2	10.2	0.18	234.8	0.761
0.20	0	12.1	0	19.9	1	17.8	2	16.6	0.20	243.9	0.733
0.22	0	13.3	0	21.9	1	22.0	2	23.1	0.22	253.5	0.713
0.24	0	14.5	0	23.9	2	2.1	3	5.5	0.24	263.6	0.700
0.26	0	15.7	1	1.9	2	6.3	3	12.0	0.26	274.0	0.700
0.28	0	16.9	1	3.8	2	10.5	3	18.5	0.28	284.1	0.713
0.30	0	18.1	1	5.8	2	14.7	4	0.9	0.30	293.8	0.733
0.32	0	19.4	1	7.8	2	18.9	4	7.4	0.32	302.8	0.761
0.34	0	20.6	1	9.8	2	23.0	4	13.9	0.34	311.1	0.796
0.36	0	21.8	1	11.8	3	3.2	4	20.3	0.36	318.7	0.834
0.38	0	23.0	1	13.8	3	7.4	5	2.8	0.38	325.5	0.873
0.40	1	0.2	1	15.8	3	11.6	5	9.2	0.40	331.9	0.908
0.42	1	1.4	1	17.8	3	15.8	5	15.7	0.42	337.8	0.939
0.44	1	2.6	1	19.8	3	19.9	5	22.2	0.44	343.3	0.964
0.46	1	3.8	1	21.8	4	0.1	6	4.6	0.46	348.6	0.984
0.48	1	5.0	1	23.7	4	4.3	6	11.1	0.48	353.8	0.995
0.50	1	6.2	2	1.7	4	8.5	6	17.6	0.50	358.8	1.000
0.52	1	7.5	2	3.7	4	12.6	7	0.0	0.52	3.8	0.995
0.54	1	8.7	2	5.7	4	16.8	7	6.5	0.54	9.0	0.984
0.56	1	9.9	2	7.7	4	21.0	7	12.9	0.56	14.3	0.964
0.58	1	11.1	2	9.7	5	1.2	7	19.4	0.58	19.8	0.939
0.60	1	12.3	2	11.7	5	5.4	8	1.9	0.60	25.7	0.908
0.62	1	13.5	2	13.7	5	9.5	8	8.3	0.62	32.1	0.873
0.64	1	14.7	2	15.7	5	13.7	8	14.8	0.64	38.9	0.834
0.66	1	15.9	2	17.6	5	17.9	8	21.3	0.66	46.5	0.796
0.68	1	17.1	2	19.6	5	22.1	9	3.7	0.68	54.8	0.761
0.70	1	18.3	2	21.6	6	2.3	9	10.2	0.70	63.9	0.733
0.72	1	19.6	2	23.6	6	6.4	9	16.6	0.72	73.5	0.713
0.74	1	20.8	3	1.6	6	10.6	9	23.1	0.74	83.6	0.700
0.76	1	22.0	3	3.6	6	14.8	10	5.6	0.76	94.0	0.700
0.78	1	23.2	3	5.6	6	19.0	10	12.0	0.78	104.1	0.713
0.80	2	0.4	3	7.6	6	23.2	10	18.5	0.80	113.8	0.733
0.82	2	1.6	3	9.6	7	3.3	11	1.0	0.82	122.8	0.761
0.84	2	2.8	3	11.5	7	7.5	11	7.4	0.84	131.1	0.796
0.86	2	4.0	3	13.5	7	11.7	11	13.9	0.86	138.7	0.834
0.88	2	5.2	3	15.5	7	15.9	11	20.3	0.88	145.5	0.873
0.90	2	6.4	3	17.5	7	20.0	12	2.8	0.90	151.9	0.908
0.92	2	7.7	3	19.5	8	0.2	12	9.3	0.92	157.8	0.939
0.94	2	8.9	3	21.5	8	4.4	12	15.7	0.94	163.3	0.964
0.96	2	10.1	3	23.5	8	8.6	12	22.2	0.96	168.6	0.984
0.98	2	11.3	4	1.5	8	12.8	13	4.7	0.98	173.8	0.995
1.00	2	12.5	4	3.5	8	16.9	13	11.1	1.00	178.8	1.000

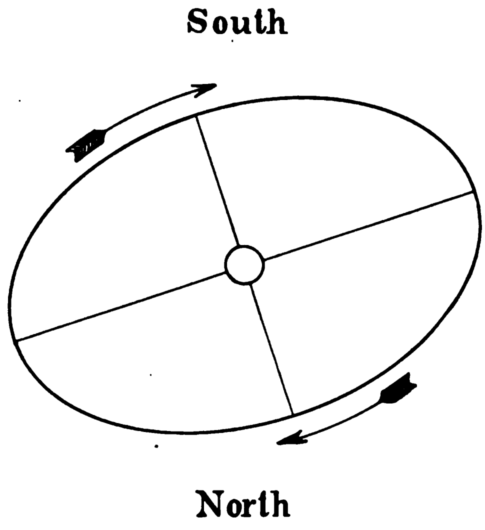
The fraction of a revolution is reckoned from the Northern Elongation.
Position angle of satellite $p = p^1 + (P - P_0)$.
Apparent distance of satellite $s = F\frac{a(\rho)}{\rho}$.

WASHINGTON MEAN TIME.

PLANETARY CONFIGURATIONS.

	d	h	m				°	′
Jan.	1	0	–	♀	Great. Hel. Lat. N.			
	1	13	–	☿	Great. Hel. Lat. N.			
	2	18	–	⊕	in Perihelion.			
	4	10	12	☌ ♆ ☾	. . . . . .	♆ −	5	39
	4	11	–	☿	Stationary.			
	9	4	–	☌ ♀ ♃	. . . . . .	♀ +	1	38
	13	5	–	☍ ♆ ☉				
	14	12	49	☌ ♃ ☾	. . . . . .	♃ +	4	6
	15	0	18	☌ ♀ ☾	. . . . . .	♀ +	5	51
	15	5	–	☿	Great. elong. W.		23	51
	16	0	–	♄	Stationary.			
	16	13	14	☌ ☿ ☾	. . . . . .	☿ +	5	48
	18	18	43	☌ ♅ ☾	. . . . . .	♅ +	4	33
	20	2	–	☌ ♅ ☉				
	25	0	–	☿	in ☋			
	27	7	2	☌ ♄ ☾	. . . . . .	♄ −	4	9
	28	8	50	☌ ♂ ☾	. . . . . .	♂ −	0	37
	31	20	28	☌ ♆ ☾	. . . . . .	♆ −	5	39
Feb.	3	3	–	□ ♄ ☉				
	4	6	–	☿	in Aphelion.			
	6	13	–	☌ ☿ ♅	. . . . . .	☿ −	0	55
	11	4	12	☌ ♃ ☾	. . . . . .	♃ +	4	37
	14	5	22	☌ ♀ ☾	. . . . . .	♀ +	5	44
	15	4	13	☌ ♅ ☾	. . . . . .	♅ +	4	36
	16	10	46	☌ ☿ ☾	. . . . . .	☿ +	2	48
	23	15	19	☌ ♄ ☾	. . . . . .	♄ −	4	23
	24	4	–	☌ ♀ ♅	. . . . . .	♀ +	0	39
	24	15	–	☿	Greatest Hel. Lat. S.			
	25	10	24	☌ ♂ ☾	. . . . . .	♂ −	1	43
	26	2	–	♀	in ☋			
	28	4	57	☌ ♆ ☾	. . . . . .	♆ −	5	46
Mar.	1	21	–	☌ ☿ ☉	Superior.			
	4	0	–	□ ♂ ☉				
	4	11	–	□ ♃ ☉				
	9	17	28	☌ ♃ ☾	. . . . . .	♃ +	5	0
	13	14	4	☌ ♅ ☾	. . . . . .	♅ +	4	43
	14	15	–	☿	in ☊			
	15	13	57	☌ ♀ ☾	. . . . . .	♀ +	3	43
	19	5	–	☿	in Perihelion.			
	19	11	37	☌ ☿ ☾	. . . . . .	☿ +	1	47
	20	6	21	☉	enters ♈, Spring com.			
	22	1	6	☌ ♄ ☾	. . . . . .	♄ −	4	36
	24	15	22	☌ ♂ ☾	. . . . . .	♂ −	2	44
	26	11	11	☌ ♆ ☾	. . . . . .	♆ −	5	53
	27	8	–	☿	Great. elong. E.		18	51
	29	13	–	☿	Greatest Hel. Lat. N.			
	31	12	–	♀	in Aphelion.			
	31	19	–	♆	Stationary.			
	31	20	–	♃	Stationary.			
Apr.	1	–	–	☾	Partial ec. invis. at W.			
	4	15	–	☿	Stationary.			
Apr.	6	3	24	☌ ♃ ☾	. . . . . .	♃ +	5	8
	9	23	46	☌ ♅ ☾	. . . . . .	♅ +	4	46
	10	14	–	□ ♆ ☉				
	14	19	–	☌ ☿ ☉	Inferior.			
	15	0	9	☌ ♀ ☾	. . . . . .	♀ +	0	5
	16	11	56	☌ ☿ ☾	. . . . . .	☿ +	1	27
	16	–	–	☉	Cen. ec. vis. as part. at W			
	18	13	23	☌ ♄ ☾	. . . . . .	♄ −	4	47
	21	22	14	☌ ♂ ☾	. . . . . .	♂ −	3	25
	22	0	–	☿	in ☋			
	22	16	45	☌ ♆ ☾	. . . . . .	♆ −	5	53
	22	22	–	♀	Greatest Hel. Lat. S.			
	23	5	–	□ ♅ ☉				
	27	4	–	☿	Stationary.			
	27	7	–	☌ ☿ ♀	. . . . . .	☿ +	0	10
May	2	5	–	☿	in Aphelion.			
	3	9	1	☌ ♃ ☾	. . . . . .	♃ +	5	[illegible]
	3	22	–	♂	Greatest Hel. Lat. N.			
	7	8	28	☌ ♅ ☾	. . . . . .	♅ +	4	41
	7	18	–	♅	Stationary.			
	12	10	–	☌ ♂ ♆	. . . . . .	♂ +	2	9
	12	15	–	☿	Great. elong. W.		26	
	14	0	–	☌ ♄ ☉				
	14	8	12	☌ ☿ ☾	. . . . . .	☿ −	4	18
	15	5	37	☌ ♀ ☾	. . . . . .	♀ −	3	11
	16	4	3	☌ ♄ ☾	. . . . . .	♄ −	4	58
	19	23	53	☌ ♆ ☾	. . . . . .	♆ −	5	46
	20	6	55	☌ ♂ ☾	. . . . . .	♂ −	3	41
	22	14	–	☿	Greatest Hel. Lat. S.			
	27	4	–	☌ ♀ ♄	. . . . . .	♀ +	1	7
	30	10	41	☌ ♃ ☾	. . . . . .	♃ +	4	48
	31	18	–	☍ ♃ ☉				
June	2	11	–	☌ ☿ ♄	. . . . . .	☿ +	0	29
	3	15	28	☌ ♅ ☾	. . . . . .	♅ +	4	31
	8	14	–	♂	in Aphelion.			
	10	14	–	☿	in ☊			
	11	12	–	☌ ☿ ♀	. . . . . .	☿ +	0	26
	12	19	53	☌ ♄ ☾	. . . . . .	♄ −	5	15
	14	3	56	☌ ♀ ☾	. . . . . .	♀ −	4	29
	14	8	32	☌ ☿ ☾	. . . . . .	☿ −	3	48
	15	5	–	☿	in Perihelion.			
	16	9	36	☌ ♆ ☾	. . . . . .	♆ −	5	38
	16	19	–	☌ ☿ ☉	Superior.			
	17	17	45	☌ ♂ ☾	. . . . . .	♂ −	3	29
	18	5	–	♀	in ☊			
	21	2	9	☉	enters ♋, Summer com.			
	25	12	–	☿	Greatest Hel. Lat. N.			
	26	10	50	☌ ♃ ☾	. . . . . .	♃ +	4	37
	29	14	–	☌ ☿ ♆	. . . . . .	☿ +	2	27
	30	20	37	☌ ♅ ☾	. . . . . .	♅ +	4	22
July	4	6	–	⊕	in Aphelion.			

APPARENT ORBIT OF THE SATELLITE OF NEPTUNE AT DATE OF OPPOSITION JANUARY 13, 1912, AS SEEN IN AN INVERTING TELESCOPE.



Date.	Position Angle of Apsis.	Apparent Distance at Apsis.
	°	″
Jan. 20,	107.2	16.8
Apr. 29,	105.9	16.1
Sept. 20,	111.2	16.0
Dec. 29,	110.6	16.8

WASHINGTON MEAN TIME OF GREATEST ELONGATION.

East.			West.			East.			West.			East.			West.		
	d	h		d	h		d	h		d	b		d	b		d	h
Jan.	1	7.7	Jan.	4	6.3	Mar.	23	15.4	Mar.	26	13.9	Oct.	15	5.5	Oct.	18	4.
	7	4.9		10	3.4		29	12.5	Apr.	1	11.0		21	2.5		24	1.
	13	2.0		16	0.6	Apr.	4	9.5		7	8.0		26	23.5		29	22.
	18	23.2		21	21.7		10	6.6		13	5.1	Nov.	1	20.6	Nov.	4	19.
	24	20.3		27	18.9		16	3.6		19	2.1		7	17.6		10	16.
	30	17.4	Feb.	2	16.0		22	0.6		24	23.1		13	14.7		16	13.
Feb.	5	14.6		8	13.1		27	21.6		30	20.2		19	11.7		22	10.
	11	11.7		14	10.3	May	3	18.6	May	6	17.2		25	8.8		28	7.
	17	8.8		20	7.4		9	15.6		12	14.1	Dec.	1	5.9	Dec.	4	4.
	23	5.9		26	4.5		15	12.6		. . . . .			7	3.0		10	1.
	29	3.0	Mar.	3	1.6		. . . . .		Sept.	24	16.0		13	0.1		15	22.
Mar.	6	0.1		8	22.7	Sept.	27	14.5		30	13.0		18	21.2		21	19.
	11	21.2		14	19.8	Oct.	3	11.5	Oct.	6	10.0		24	18.3		27	16.
	17	18.3		20	16.9		9	8.5		12	7.0		30	15.4		33	13.

The above times are the instants of each passage of the satellite through the apsi **of its apparent orbit.** The position of the satellite at any other time may be found b **measuring around** the orbit from the apsis last passed through, bearing in mind that th **radius vector** of the satellite describes equal areas in equal times.

The period of the satellite of Neptune is $5^{d}\ 21^{h}.044$.

NOTE.—In the preceding diagrams the central circle represents the planet and is on the same scale as the orb

[illegible]

PHENOMENA, 1912.

WASHINGTON MEAN TIME.

PLANETARY CONFIGURATIONS.

	d	h	m			°	′
an.	1	0	–	♀	Great. Hel. Lat. N.		
	1	13	–	☿	Great. Hel. Lat. N.		
	2	18	–	· ⊕	in Perihelion.		
	4	10	12	☌ ♆ ☾	······ ♆ —	5	39
	4	11	–	☿	Stationary.		
	9	4	–	☌ ♀ ♃	······ ♀ +	1	38
	13	5	–	☍ ♆ ☉			
		2	49	☌ ♃ ☾	······ ♃ +	4	6
		0	18	☌ ♀ ☾	······ ♀ +	5	51
		5	–	☿	Great. elong. W.	23	51
	6	0	–	♄	Stationary.		
	6	13	14	☌ ☿ ☾	······ ☿ +	5	48
	18	18	43	☌ ♅ ☾	······ ♅ +	4	33
	20	2	–	☌ ♅ ☉			
	25	0	–	☿	in ☋		
		7	2	☌ ♄ ☾	······ ♄ —	4	9
		8	50	☌ ♂ ☾	······ ♂ —	0	37
		0	28	☌ ♆ ☾	······ ♆ —	5	39
		3	–	□ ♄ ☉			
	4	6	–	☿	in Aphelion.		
	6	13	–	☌ ☿ ♅	······ ☿ —	0	55
	11	4	12	☌ ♃ ☾	······ ♃ +	4	37
	14	5	22	☌ ♀ ☾	······ ♀ +	5	44
	15	4	13	☌ ♅ ☾	······ ♅ +	4	36
	16	10	46	☌ ☿ ☾	······ ☿ +	2	48
	23	15	19	☌ ♄ ☾	······ ♄ —	4	23
	24	4	–	☌ ♀ ♅	······ ♀ +	0	39
	24	15	–	☿	Greatest Hel. Lat. S.		
	25	10	24	☌ ♂ ☾	······ ♂ —	1	43
	26	2	–	♀	in ☋		
	28	4	57	☌ ♆ ☾	······ ♆ —	5	46
Mar.	1	21	–	☌ ☿ ☉	Superior.		
	4	0	–	□ ♂ ☉			
	4	11	–	□ ♃ ☉			
	9	17	28	☌ ♃ ☾	······ ♃ +	5	0
	13	14	4	☌ ♅ ☾	······ ♅ +	4	43
	14	15	–	☿	in ☊		
	15	13	57	☌ ♀ ☾	······ ♀ +	3	43
	19	5	–	☿	in Perihelion.		
	19	11	37	☌ ☿ ☾	······ ☿ +	1	47
	20	6	21	☉	enters ♈, Spring com.		
	22	1	6	☌ ♄ ☾	······ ♄ —	4	36
	24	15	22	☌ ♂ ☾	······ ♂ —	2	44
	26	11	11	☌ ♆ ☾	······ ♆ —	5	53
	27	8	–	☿	Great. elong. E.	18	51
	29	13	–	☿	Greatest Hel. Lat. N.		
	31	12	–	♀	in Aphelion.		
	31	19	–	♆	Stationary.		
	31	20	–	♃	Stationary.		
Apr.	1	–	–	☾	Partial ec. invis. at W.		
	4	15	–	☿	Stationary.		

	d	h	m		
Apr.	6	3	24	☌ ♃ ☾	······ ♃ +
	9	23	46	☌ ♅ ☾	······ ♅ +
	10	14	–	□ ♆ ☉	
	14	19	–	☌ ☿ ☉	Inferior.
	15	0	9	☌ ♀ ☾	······ ♀ +
	16	11	56	☌ ☿ ☾	······ ☿ +
	16	–	–	☉	Cen. ec. vis. as part.
	18	13	23	☌ ♄ ☾	······ ♄ —
	21	22	14	☌ ♂ ☾	······ ♂ —
	22	0	–	☿	in ☋
	22	16	45	☌ ♆ ☾	······ ♆ —
	22	22	–	♀	Greatest Hel. Lat
	23	5	–	□ ♅ ☉	
	27	4	–	☿	Stationary.
	27	7	–	☌ ☿ ♀	······ ☿ +
May	2	5	–	☿	in Aphelion.
	3	9	1	☌ ♃ ☾	······ ♃ +
	3	22	–	♂	Greatest Hel. Lat
	7	8	28	☌ ♅ ☾	······ ♅ +
	7	18	–	♅	Stationary.
	12	10	–	☌ ♂ ♆	······ ♂ +
	12	15	–	☿	Great. elong. W.
	14	0	–	☌ ♄ ☉	
	14	8	12	☌ ☿ ☾	······ ☿ —
	15	5	37	☌ ♀ ☾	······ ♀ —
	16	4	3	☌ ♄ ☾	······ ♄ —
	19	23	53	☌ ♆ ☾	······ ♆ —
	20	6	55	☌ ♂ ☾	······ ♂ —
	22	14	–	☿	Greatest Hel. Lat
	27	4	–	☌ ♀ ♄	······ ♀ +
	30	10	41	☌ ♃ ☾	······ ♃ +
	31	18	–	☍ ♃ ☉	
June	2	11	–	☌ ☿ ♄	······ ☿ +
	3	15	28	☌ ♅ ☾	······ ♅ +
	8	14	–	♂	in Aphelion.
	10	14	–	☿	in ☊
	11	12	–	☌ ☿ ♀	······ ☿ +
	12	19	53	☌ ♄ ☾	······ ♄ —
	14	3	56	☌ ♀ ☾	······ ♀ —
	14	8	32	☌ ☿ ☾	······ ☿ —
	15	5	–	☿	in Perihelion.
	16	9	36	☌ ♆ ☾	······ ♆ —
	16	19	–	☌ ☿ ☉	Superior.
	17	17	45	☌ ♂ ☾	······ ♂ —
	18	5	–	♀	in ☊
	21	2	9	☉	enters ♋, Summer
	25	12	–	☿	Greatest Hel. Lat
	26	10	50	☌ ♃ ☾	······ ♃ +
	29	14	–	☌ ☿ ♆	······ ☿ +
	30	20	37	☌ ♅ ☾	······ ♅ +
July	4	6	–	⊕	in Aphelion.

WASHINGTON MEAN TIME.

PLANETARY CONFIGURATIONS.

	d	h	m			°	′
ly	5	9	–	☌ ♀ ☉	Superior.		
	10	11	5	☌ ♄ ☾	...... ♄ —	5	36
	13	3	–	☌ ♀ ♆	...... ♀ +	1	27
	13	21	21	☌ ♆ ☾	...... ♆ —	5	34
	13	22	50	☌ ♀ ☾	...... ♀ —	4	6
	15	12	16	☌ ☿ ☾	...... ☿ —	3	56
	15	18	–	☌ ♆ ☉			
	16	7	0	☌ ♂ ☾	...... ♂ —	2	46
	18	23	–	☿	in ☋		
	21	20	–	♀	in Perihelion.		
	23	13	4	☌ ♃ ☾	...... ♃ +	4	36
	24	2	–	☍ ♅ ☉			
	24	22	–	☿	Great. elong. E.	27	6
	28	0	37	☌ ♅ ☾	...... ♅ +	4	21
	29	4	–	☿	in Aphelion.		
g.	2	3	–	♃	Stationary.		
	6	23	49	☌ ♄ ☾	...... ♄ —	6	0
	7	0	–	☿	Stationary.		
	10	9	31	☌ ♆ ☾	...... ♆ —	5	37
	12	18	–	♀	Greatest Hel. Lat. N.		
	12	19	23	☌ ♀ ☾	...... ♀ —	2	13
	12	22	46	☌ ☿ ☾	...... ☿ —	8	31
	13	22	42	☌ ♂ ☾	...... ♂ —	1	32
	14	1	–	☌ ☿ ♀	...... ☿ —	6	33
	18	13	–	☿	Greatest Hel. Lat. S.		
	19	20	2	☌ ♃ ☾	...... ♃ +	4	44
	21	16	–	☌ ☿ ☉	Inferior.		
	24	4	41	☌ ♅ ☾	...... ♅ +	4	26
	26	17	–	□ ♄ ☉			
	29	19	–	□ ♃ ☉			
	30	14	–	☿	Stationary.		
pt.	3	8	49	☌ ♄ ☾	...... ♄ —	6	20
	6	14	–	☿	in ☊		
	6	20	14	☌ ♆ ☾	...... ♆ —	5	43
	7	10	–	☿	Great. elong. W.	17	59
	8	16	–	☌ ♀ ♂	...... ♀ +	0	30
	9	2	6	☌ ☿ ☾	...... ☿ —	3	18
	11	4	–	☿	in Perihelion.		
	11	16	35	☌ ♂ ☾	...... ♂ +	0	4
	11	19	53	☌ ♀ ☾	...... ♀ +	0	41
	15	23	–	♄	Stationary.		
	16	8	25	☌ ♃ ☾	...... ♃ +	4	54
	20	10	5	☌ ♅ ☾	...... ♅ +	4	34
	21	11	–	☿	Greatest Hel. Lat. N.		
	22	17	0	☉	enters ♎, Autumn com.		
	25	–	–	☾	Partial ec. invis. at W.		
	30	14	14	☌ ♄ ☾	...... ♄ —	6	29
t.	3	13	–	☌ ☿ ☉	Superior.		
	4	4	17	☌ ♆ ☾	...... ♆ —	5	46
	7	19	–	♀	in ☋		
	8	22	–	♅	Stationary.		
Oct.	9	–	–	☉	Tot. ec. invis. at Wash.		
	10	6	27	☌ ☿ ☾	...... ☿ +	1	35
	10	12	1	☌ ♂ ☾	...... ♂ +	1	44
	11	22	57	☌ ♀ ☾	...... ♀ +	2	52
	13	12	–	☌ ☿ ♂	...... ☿ —	0	11
	14	1	7	☌ ♃ ☾	...... ♃ +	5	2
	14	22	–	☿	in ☋		
	17	17	31	☌ ♅ ☾	...... ♅ +	4	35
	19	1	–	□ ♆ ☉			
	22	16	–	□ ♅ ☉			
	25	4	–	☿	in Aphelion.		
	27	18	1	☌ ♄ ☾	...... ♄ —	6	26
	28	21	–	♆	Stationary.		
	31	10	4	☌ ♆ ☾	...... ♆ —	5	43
Nov.	4	10	–	☌ ♂ ☉			
	7	11	–	☌ ♀ ♃	...... ♀ —	1	43
	8	8	20	☌ ♂ ☾	...... ♂ +	3	7
	10	1	42	☌ ☿ ☾	...... ☿ +	1	53
	10	20	13	☌ ♃ ☾	...... ♃ +	5	5
	11	3	13	☌ ♀ ☾	...... ♀ +	3	21
	11	5	–	♀	in Aphelion.		
	14	2	51	☌ ♅ ☾	...... ♅ +	4	27
	14	12	–	☿	Greatest Hel. Lat. S.		
	17	13	–	♂	in ☋		
	18	21	–	☿	Great. elong. E.	22	15
	20	12	–	☌ ☿ ♃	...... ☿ —	2	47
	22	13	–	☍ ♄ ☉			
	23	22	39	☌ ♄ ☾	...... ♄ —	6	17
	27	15	41	☌ ♆ ☾	...... ♆ —	5	33
	28	10	–	☿	Stationary.		
Dec.	2	14	–	☌ ☿ ♃	...... ☿ —	0	35
	3	13	–	☿	in ☊		
	3	15	–	♀	Greatest Hel. Lat. S.		
	7	5	3	☌ ♂ ☾	...... ♂ +	4	2
	8	1	59	☌ ☿ ☾	...... ☿ +	6	11
	8	3	–	☿	in Perihelion.		
	8	6	–	☌ ☿ ☉	Inferior.		
	8	15	47	☌ ♃ ☾	...... ♃ +	5	7
	11	9	37	☌ ♀ ☾	...... ♀ +	2	42
	11	13	8	☌ ♅ ☾	...... ♅ +	4	15
	12	22	–	☌ ♀ ♅	...... ♀ —	1	36
	14	0	–	☌ ☿ ♂	...... ☿ +	3	4
	18	3	–	☌ ♃ ☉			
	18	4	–	☿	Stationary.		
	18	10	–	☿	Greatest Hel. Lat. N.		
	21	5	21	☌ ♄ ☾	...... ♄ —	6	12
	21	11	37	☉	enters ♑, Winter com.		
	24	23	16	☌ ♆ ☾	...... ♆ —	5	25
	27	16	–	☿	Great. elong. W.	22	23
	31	8	–	⊕	in Perihelion.		

OBSERVATORIES, 1912.

No.	Place.	Geographic Latitude.	Reduction to Geocentric Latitude.	Altitude (*Meters.*)	Log ρ (*Including altitude*).	Longitude from Washington.
		° ′ ″	′ ″			h m s
1	Abbadia	+43 22 52.2	−11 39.2	69	9.999313	− 5 1 15.7
2	Adelaide	−34 55 38	+10 56.8	43	9.999523	+ 9 37 23.92
3	Albany, N. Y. . .	+42 39 12.7	−11 38.0	67	9.999331	− 0 13 9.0
4	Algiers	+36 47 50	−11 11.3	342	9.999497	− 5 20 24.33
5	Allegheny . . .	+40 28 58.0	−11 31.4	384	9.999409	+ 0 11 49.61
6	Amherst, Mass. .	+42 21 56.5	−11 37.3	110	9.999341	− 0 18 9.85
7	Ann Arbor . . .	+42 16 48.0	−11 37.0	285	9.999355	+ 0 26 39.41
8	Appleton, Wis. .	+44 15 39	−11 40.1	238	9.999301	+ 0 45 20.11
9	Arcetri	+43 45 14.6	−11 39.7	184	9.999310	− 5 53 17.12
10	Arequipa, Peru .	−16 22 28.0	+ 6 17.8	2452	0.000051	− 0 22 4.05
11	Armagh, Ireland .	+54 21 12.7	−11 4.2	61	9.999033	− 4 41 40.4
12	Athens	+37 58 20.7	−11 18.9	107	9.999452	− 6 43 8.70
13	Baltimore, Md . .	+39 17 48	−11 25.5	75	9.999417	− 0 1 49.8
14	Bamberg, Bavaria.	+49 53 6.0	−11 30.7	300	9.999161	− 5 51 49.43
15	Barcelona	+41 25 18	−11 34.7	420	9.999387	− 5 16 43.8
16	Bayswater	−31 55 13	+10 27.8	30	9.999593	+11 8 6
17	Beloit, Wis. . . .	+42 30 8.4	−11 37.6	. . .	9.999331	+ 0 47 51.5
18	Bergen, Norway .	+60 23 54	−10 2.7	. . .	9.998888	− 5 29 28.53
19	Berkeley	+37 52 23.6	−11 18.3	97	9.999455	+ 3 0 46.94
20	Berlin	+52 30 16.7	−11 17.1	47	9.999078	− 6 1 50.63
21	Berlin	+52 31 30.7	−11 17.0	. . .	9.999075	− 6 1 43.23
22	Berlin	+52 29 7	−11 17.3	38	9.999078	− 6 2 10.0
23	Berne, Switzerland	+46 57 8.7	−11 39.0	573	9.999255	− 5 38 1.51
24	Besançon, France .	+47 14 59.0	−11 38.5	310	9.999229	− 5 32 12.95
25	Bethlehem, Pa. .	+40 36 23.1	−11 31.9	. . .	9.999379	− 0 6 43.93
26	Birr Castle . . .	+53 5 47.0	−11 13.3	56	9.999064	− 4 36 34.9
27	Bloomington . .	+39 9 54	−11 25.5	266	9.999433	+ 0 38 38
28	Bogota	+ 4 36 15.4	−11 51.5	2634	0.000170	− 0 11 21.58
29	Bombay	+18 53 45	− 7 8.1	19	9.999848	− 9 59 31.52
30	Bonn	+50 43 45.0	−11 26.9	62	9.999124	− 5 36 39.00
31	Bordeaux	+44 50 7.2	−11 40.4	73	9.999276	− 5 6 10.24
32	Boston	+42 20 58	−11 37.2	. . .	9.999334	− 0 23 56.7
33	Bothkamp	+54 12 9.6	−11 5.3	32	9.999035	− 5 48 47.0
34	Bremen	+53 4 36	−11 13.4	. . .	9.999061	− 5 43 31.7
35	Breslau	+51 6 55.8	−11 25.0	147	9.999120	− 6 16 24.57
36	Brisbane	−27 28 0	+ 9 32.2	. . .	9.999689	+ 8 39 37.8
37	Brussels	+50 47 55.5	−11 26.6	100	9.999125	− 5 25 42.7
38	Budapest	+47 29 34.7	−11 38.0	. . .	9.999202	− 6 24 31.1
39	Cambridge, Eng. .	+52 12 51.6	−11 18.9	26	9.999084	− 5 8 38.53
40	Cambridge, Mass. .	+42 22 47.6	−11 37.3	24	9.999336	− 0 23 44.73
41	Cape of Good Hope.	−33 56 3.6	+10 48.0	16	9.999544	− 6 22 10.54
42	Carloforte	+39 8 9	−11 25.3	18	9.999417	− 5 41 30.7
43	Catania, Sicily . .	+37 30 13.3	−11 16.0	47	9.999460	− 6 8 36
44	Charkow, Russia .	+50 0 9.6	−11 30.2	138	9.999147	− 7 33 11.55
45	Charlottesville . .	+38 2 1.2	−11 19.3	250	9.999461	+ 0 5 49.44

No.	LONGITUDE FROM GREENWICH.		Reduction from Gr. Sid. Time of Mean Noon to Local S. T. M. N.	DESCRIPTION.
	In Time.	In Arc.		
	h m s	° ′ ″	s	
1	+ 0 7 0.1	+ 1 45 1.5	+ 1.15	Obs. Paris Academy of Science, Hendaye.
2	− 9 14 20.30	−138 35 4.5	− 91.06	South Australia.
3	+ 4 55 6.8	+ 73 46 42.0	+ 48.48	Dudley Obs. Old Obs. 36″.8 N., 6^s.79 E.
4	− 0 12 8.55	− 3 2 8.2	− 2.00	At Bourzareah, near Algiers. Old Obs. 3′.8 S., 8^s E.
5	+ 5 20 5.39	+ 80 1 20.8	+ 52.58	Obs. of West. Univ. Pa. Old Obs., 76″.4 S., 2^s.46 E.
6	+ 4 50 5.93	+ 72 31 29.0	+ 47.66	Amherst College Obs. Old Obs. 20″.6 N., 1^s.26 E.
7	+ 5 34 55.19	+ 83 43 47.8	+ 55.02	Detroit Obs. of the University of Michigan.
8	+ 5 53 35.89	+ 88 23 58.4	+ 58.09	Underwood Obs. of the Lawrence University.
9	− 0 45 1.34	− 11 15 20.1	− 7.40	Near Florence, Italy.
10	+ 4 46 11.73	+ 71 32 56.0	+ 47.02	Branch of the Harvard College Observatory.
11	+ 0 26 35.4	+ 6 38 51.0	+ 4.37	University Observatory.
12	− 1 34 52.92	− 23 43 13.8	− 15.59	National Observatory of Greece.
13	+ 5 6 26.0	+ 76 36 30	+ 50.34	Johns Hopkins University Observatory.
14	− 0 43 33.65	− 10 53 24.8	− 7.16	Remeis Observatory.
15	− 0 8 28.0	− 2 7 0	− 1.39	Fabra Obs. of the Royal Acad. of Sci. and Arts.
16	− 7 43 38	−115 54 30	− 76.16	International Latitude Obs. West Australia.
17	+ 5 56 7.3	+ 89 1 49.5	+ 58.50	Smith Observatory of Beloit College.
18	− 0 21 12.75	− 5 18 11.2	− 3.48	Observatory of Naval School.
19	+ 8 9 2.72	+122 15 40.8	+ 80.34	Student's Obs. of the University of California.
20	− 0 53 34.85	− 13 23 42.8	− 8.80	Royal Obs. Old Obs. 56″.4 N., 0^s.39 W.
21	− 0 53 27.45	− 13 21 51.8	− 8.78	Urania Observatory
22	− 0 53 54.2	− 13 28 33	− 8.86	Treptow Observatory.
23	− 0 29 45.73	− 7 26 26.0	− 4.89	Observatory of the Cantonal University.
24	− 0 23 57.17	− 5 59 17.6	− 3.94	National Observatory.
25	+ 5 1 31.85	+ 75 22 57.8	+ 49.53	Sayre Obs. of Lehigh Univ. at South Bethlehem.
26	+ 0 31 40.9	+ 7 55 13.5	+ 5.20	Private observatory of the Earl of Rosse.
27	+ 5 46 54	+ 86 43 30	+ 56.99	Kirkwood Obs. of the University of Indiana.
28	+ 4 56 54.20	+ 74 13 33.0	+ 48.77	National Obs. of the Republic of Colombia.
29	− 4 51 15.74	− 72 48 56.1	− 47.85	Government Obs. Colaba.
30	− 0 28 23.22	− 7 5 48.3	− 4.66	Royal University Observatory.
31	+ 0 2 5.54	+ 0 31 23.1	+ 0.34	Observatory, Univ. of Bordeaux at Floirac.
32	+ 4 44 19.1	+ 71 4 46.5	+ 46.71	Obs. of Boston Univ., Old Obs. 34″ N., 4^s.1 E.
33	− 0 40 31.2	− 10 7 48.0	− 6.66	Observatory of Herr von Bülow.
34	− 0 35 15.9	− 8 48 58.5	− 5.79	Formerly Olber's Observatory.
35	− 1 8 8.79	− 17 2 11.8	− 11.20	Royal University Observatory.
36	−10 12 6.4	−153 1 36	−100.55	Queensland, Australia.
37	− 0 17 26.9	− 4 21 43.5	− 2.87	Royal Obs. of Belgium. Old Obs. 3′18″ N., 1^s.8 E.
38	− 1 16 15.3	− 19 3 49.5	− 12.53	Geodetic Obs. of Royal Polytechnic School.
39	− 0 0 22.75	− 0 5 41.2	− 0.06	University of Cambridge Observatory.
40	+ 4 44 31.05	+ 71 7 45.8	+ 46.74	Harvard College Observatory.
41	− 1 13 54.76	− 18 28 41.4	− 12.14	Royal Observatory.
42	− 0 33 14.9	− 8 18 43.5	− 5.46	Internat. Lat. Obs., Island of Sardinia.
43	− 1 0 20	− 15 5 0	− 9.91	Royal Astrophysical Obs. of the University.
44	− 2 24 55.77	− 36 13 56.6	− 23.81	University Observatory.
45	+ 5 14 5.22	+ 78 31 18.3	+ 51.60	Leander McCormick Obs. of Univ. of Virginia.

No.	PLACE.	Geographic Latitude.	Reduction to Geocentric Latitude.	Altitude (*Meters*).	Log ρ (*Including altitude*).	Longitude from Washington.
		° ′ ″	′ ″			h m s
46	Chicago	+41 50 1.0	−11 35.9	. . .	9.999 348	+ 0 42 11.06
47	Christiania . . .	+59 54 44.0	−10 8.7	25	9.998 901	− 5 51 9.30
48	Cincinnati, Ohio .	+39 8 19.5	−11 25.4	249	9.999 433	+ 0 29 25.62
49	Cleveland, Ohio .	+41 30 14.5	−11 34.9	212	9.999 370	+ 0 18 10.04
50	Clinton, N. Y. . .	+43 3 17.0	−11 38.7	276	9.999 335	− 0 6 38.33
51	Coimbra	+40 12 24.5	−11 30.3	99	9.999 396	− 4 34 32.7
52	Columbia . . .	+38 56 51.7	−11 24.4	225	9.999 436	+ 1 1 2.55
53	Columbus . . .	+39 59 50.4	−11 29.4	. . .	9.999 394	+ 0 23 46.8
54	Copenhagen . . .	+55 41 12.6	−10 53.1	14	9.998 998	− 5 58 34.48
55	Cordoba	−31 25 15.2	+10 22.2	434	9.999 632	− 0 51 27.56
56	Cracow	+50 3 52.0	−11 29.9	220	9.999 152	− 6 28 6.06
57	Dantzig	+54 21 18.0	−11 4.1	3	9.999 029	− 6 22 55.4
58	Dehra Dun . . .	+30 18 51.8	−10 9.4	687	9.999 674	−10 20 29.25
59	Denver, Colo. . .	+39 40 36.4	−11 27.9	1650	9.999 514	+ 1 51 31.85
60	Des Moines, Iowa .	+41 36 0	−11 35.2	296	9.999 374	+ 1 6 14.78
61	Dorpat	+58 22 47.1	−10 26.4	65	9.998 938	− 6 55 9.07
62	Dresden	+51 2 16.8	−11 25.4	. . .	9.999 112	− 6 3 10.63
63	Dublin	+53 23 13.1	−11 11.3	86	9.999 059	− 4 42 54.7
64	Dun Echt., Scotland	+57 9 36	−10 39.2	141	9.998 972	− 4 58 35.8
65	Durham	+54 46 6.2	−11 0.9	107	9.999 026	− 5 1 56.03
66	Düsseldorf . . .	+51 12 25.0	−11 24.6	26	9.999 110	− 5 35 20.8
67	Edinburgh . . .	+55 55 28.0	−10 50.9	134	9.999 000	− 4 55 31.6
68	Edinburgh . . .	+55 57 23.2	−10 50.7	106	9.998 998	− 4 55 32.7
69	Evanston, Ill. . .	+42 3 33.4	−11 36.5	175	9.999 354	+ 0 42 26.5
70	Flagstaff, Ariz. .	+35 12 30.4	−10 59.2	2210	9.999 664	+ 2 18 28.79
71	Gaithersburg, Md.	+39 8 13.2	−11 25.4	165	9.999 427	+ 0 0 31.95
72	Geneva, N. Y. . .	+42 52 46.2	−11 38.3	152	9.999 331	− 0 0 14.78
73	Geneva, Switzerland	+46 11 58.8	−11 39.9	406	9.999 264	− 5 32 52.49
74	Genoa	+44 25 9.3	−11 40.2	105	9.999 288	− 5 43 57.11
75	Georgetown, D. C.	+38 54 26.7	−11 24.2	46	9.999 425	+ 0 0 2.48
76	Glasgow, Mo. . .	+39 13 45.6	−11 25.8	227	9.999 430	+ 1 3 2.30
77	Glasgow, Scotland .	+55 52 42.8	−10 51.5	55	9.998 997	− 4 51 5.23
78	Gotha	+50 56 37.9	−11 25.9	320	9.999 136	− 5 51 6.27
79	Göttingen . . .	+51 31 47.9	−11 22.8	160	9.999 111	− 5 48 2.07
80	Greencastle, Ind. .	+39 38 46.6	−11 27.8	262	9.999 421	+ 0 39 8.56
81	Greenwich . . .	+51 28 38.1	−11 23.1	47	9.999 104	− 5 8 15.78
82	Hamburg . . .	+53 28 46.0	−11 10.6	40	9.999 054	− 5 49 14.3
83	Hamburg . . .	+53 33 7.0	−11 10.1	25	9.999 051	− 5 48 9.6
84	Hamburg . . .	+53 32 51.8	−11 10.2	30	9.999 051	− 5 48 9.20
85	Hanover, N. H. .	+43 42 15.3	−11 39.6	183	9.999 312	− 0 19 7.87
86	Harrow, England .	+51 34 47.1	−11 22.6	67	9.999 103	− 5 6 55.92
87	Haverford, Pa . .	+40 0 40.1	−11 29.4	. . .	9.999 394	− 0 7 3.08
88	Heidelberg . . .	+49 23 55.2	−11 32.6	570	9.999 192	− 5 43 8.91
89	Heidelberg . . .	+49 23 54.9	−11 32.6	562	9.999 191	− 5 43 10.03
90	Helsingfors . . .	+60 9 42.6	−10 5.6	38	9.998 896	− 6 48 4.93

Longitude from Greenwich.		Reduction from Gr. Sid. Time of Mean Noon to Local S. T. M. N	Description.
In Time.	In Arc.		
h m s	° ′ ″	s	
+5 50 26.84	+ 87 36 42.6	+57.57	Old Obs.; transferred to Evanston, Ill, in 1887.
−0 42 53.52	− 10 43 22.8	− 7.05	Observatory of the University.
+5 37 41.40	+ 84 25 21.0	+55.48	Univ.Obs.on Mt.Lookout. OldObs.1′53″S.17ˢ.6W.
+5 26 25.82	+ 81 36 27.3	+53.62	Obs. of Case School of Applied Science.
+5 1 37.45	+ 75 24 21.7	+49.55	Litchfield Obs. of Hamilton College.
+0 33 43.1	+ 8 25 46.5	+ 5.54	Royal Astronomical Observatory of Portugal.
+6 9 18.33	+ 92 19 35.0	+60.67	Laws Observatory of the University of Missouri.
+5 32 2.6	+ 83 0 39.0	+54.55	Emerson McMillan Obs. of Ohio State Univ.
−0 50 18.70	− 12 34 40.5	− 8.26	Astronomical Observatory of the University
+4 16 48.22	+ 64 12 3.3	+42.19	National Observatory of Argentine Republic.
−1 19 50.28	− 19 57 34.2	−13.12	Royal University Observatory.
−1 14 39.6	− 18 39 54.0	−12.26	Western Prussia.
−5 12 13.47	− 78 3 22.0	−51.29	Obs. Great Trigonometric Survey of India.
+6 59 47.63	+104 56 54.4	+68.96	Chamberlin Observatory of the Univ. of Denver.
+6 14 30.56	+ 93 37 38.4	+61.52	Drake University Observatory.
−1 46 53.29	− 26 43 19.3	−17.56	Observatory Imperial University (Jurjew).
−0 54 54.85	− 13 43 42.7	− 9.02	Baron Engelhardt's Observatory.
+0 25 21.1	+ 6 20 16.5	+ 4.16	Observatory of Trinity College at Dunsink.
+0 9 40.0	+ 2 25 0.0	+ 1.59	Formerly Lord Crawford's Observatory.
+0 6 19.75	+ 1 34 56.3	+ 1.04	Observatory of the University.
−0 27 5.0	− 6 46 15.0	− 4.45	Municipal Observatory, Bilk.
+0 12 44.2	+ 3 11 3.0	+ 2.09	Roy. Obs. of Scotland, Blackford Hill.
+0 12 43.1	+ 3 10 46.5	+ 2.09	City Observatory, Calton Hill.
+5 50 42.3	+ 87 40 34.5	+57.61	Dearborn Observatory of North Western Univ.
+7 26 44.57	+111 41 8.6	+73.39	Lowell Observatory.
+5 8 47.73	+ 77 11 56.0	+50.73	International Latitude Observatory.
+5 8 1.00	+ 77 0 15.0	+50.60	Smith Observatory
−0 24 36.71	− 6 9 10.7	− 4.04	Municipal Observatory.
−0 35 41.33	− 8 55 20.0	− 5.86	Hydrographic Institute.
+5 8 18.26	+ 77 4 33.9	+50.65	Georgetown College Observatory, Washington.
+6 11 18.08	+ 92 49 31.2	+61.00	Morrison Observatory.
+0 17 10.55	+ 4 17 38.3	+ 2.82	University Observatory.
−0 42 50.49	− 10 42 37.3	− 7.04	Ducal Observatory, Saxe-Coburg-Gotha.
−0 39 46.29	− 9 56 34.3	− 6.53	Royal University Observatory.
+5 47 24.34	+ 86 51 5.1	+57.07	McKim Observatory of De Pauw University.
0 0 0.00	0 0 0.0	0.00	Royal Observatory.
−0 40 58.5	− 10 14 37.5	− 6.73	New Observatory Bergedorf.
−0 39 53.8	− 9 58 27.0	− 6.55	Old Observatory.
−0 39 53.42	− 9 58 21.3	− 6.55	Imperial Marine Observatory.
+4 49 7.91	+ 72 16 58.7	+47.50	Shattuck Observatory of Dartmouth College.
+0 1 19.86	+ 0 19 57.9	+ 0.22	Colonel Tupman's Observatory.
+5 1 12.70	+ 75 18 10.5	+49.48	Haverford College Observatory
−0 34 53.13	− 8 43 17.0	− 5.73	Astronomical Institute, Königstuhl.
−0 34 54.25	− 8 43 33.7	− 5.73	Astrophysical Institute, Königstuhl.
−1 39 49.15	− 24 57 17.3	−16.40	University Observatory.

OBSERVATORIES, 1912.

No.	PLACE.	Geographic Latitude.	Reduction to Geocentric Latitude.	Altitude (*Meters*).	Log ρ (*Including altitude*).	Longitude from Washington.
		° ′ ″	′ ″			h m s
91	Herény, Hungary .	+47 15 47.4	−11 38.4	229	9.999 224	− 6 14 40.5
92	Hong Kong . . .	+22 18 13.4	− 8 10.7	34	9.999 791	+11 15 2.36
93	Iowa City, Iowa .	+41 40 0	−11 35.4	183	9.999 364	+ 0 57 50
94	Ithaca, N. Y. . .	+42 26 47.3	−11 37.4	256	9.999 349	− 0 2 19.79
95	Jamaica	+18 24 51	− 6 58.7	. . .	9.999 854	+ 0 3 13.70
96	Jena, Prussia . .	+50 55 34.9	−11 26.0	156	9.999 126	− 5 54 36.05
97	Jena, Prussia . .	+50 56 15.7	−11 25.9	174	9.999 126	− 5 54 37.8
98	Kalocsa	+46 31 41.7	−11 39.6	117	9.999 235	− 6 24 10.12
99	Karlsruhe, Baden .	+49 0 29.6	−11 33.9	110	9.999 170	− 5 41 52.2
100	Kazan, Russia . .	+55 50 20.0	−10 51.7	98	9.999 000	− 8 23 32.3
101	Kew	+51 28 6	−11 23.2	11	9.999 102	− 5 7 0.7
102	Kiel, Holstein . .	+54 20 27.6	−11 4.3	48	9.999 033	− 5 48 51.33
103	Kief, Russia . .	+50 27 10.5	−11 28.2	182	9.999 139	− 7 10 16.42
104	Kis-Kartal . . .	+47 41 54.8	−11 37.5	. . .	9.999 197	− 6 26 27.5
105	Königsberg, Prussia	+54 42 50.4	−11 1.3	22	9.999 022	− 6 30 14.82
106	Kremsmünster .	+48 3 23.1	−11 36.7	384	9.999 214	− 6 4 47.37
107	La Plata	−34 54 30.3	+10 56.7	12	9.999 521	− 1 16 38.8
108	Lawrence . . .	+36 57 30	−11 12 4	311	9.999 491	+ 1 12 42
109	Leiden, Holland .	+52 9 20.0	−11 19.3	4	9.999 084	− 5 26 11.95
110	Leipzig, Saxony .	+51 20 5.9	−11 23.9	119	9.999 112	− 5 57 49.76
111	Liège, Belgium . .	+50 37 7	−11 27.5	127	9.999 132	− 5 30 31.0
112	Lisbon	+38 42 31.3	−11 23.1	94	9.999 433	− 4 31 31.10
113	Liverpool . . .	+53 24 4.8	−11 11.2	62	9.999 057	− 4 55 58.45
114	Lund, Sweden . .	+55 41 51.6	−10 53.0	38	9.999 000	− 6 1 0.79
115	Lussinpiccolo . .	+44 32 11.0	−11 40.3	42	9.999 281	− 6 6 8.19
116	Lyons, France . .	+45 41 41.0	−11 40.3	300	9.999 268	− 5 27 24.33
117	Madison, Wis. . .	+43 4 36.8	−11 38.7	292	9.999 336	+ 0 49 22.15
118	Madras	+13 4 8.0	− 5 7.6	7	9.999 925	−10 29 14.90
119	Madrid	+40 24 29.7	−11 31.1	655	9.999 428	− 4 53 30.66
120	Manila	+14 35 25	− 5 40.5	3	9.999 907	+10 47 54
121	Mare Island, Cal. .	+38 5 55.8	−11 19.7	22	9.999 444	+ 3 0 49.8
122	Markree, Ireland .	+54 10 31.8	−11 5.5	45	9.999 037	− 4 34 27.4
123	Marseilles . . .	+43 18 17.5	−11 39.1	75	9.999 315	− 5 29 50.37
124	Mauritius . . .	−20 5 39	+ 7 30.8	55	9.999 832	− 8 58 28.4
125	Melbourne, Victoria	−37 49 53.4	+11 18.1	28	9.999 451	+ 9 11 50.2
126	Meudon	+48 48 18	−11 34.6	162	9.999 180	− 5 17 11.4
127	Middletown, Conn.	+41 33 16.0	−11 35.1	. . .	9.999 355	− 0 17 38.60
128	Milan	+45 27 59.3	−11 40.4	120	9.999 262	− 5 45 1.70
129	Minneapolis . . .	+44 58 40.0	−11 40.4	260	9.999 285	+ 1 4 41.06
130	Mizusawa . . .	+39 8 3.6	−11 25.4	62	9.999 420	+ 9 27 13.47
131	Modena, Italy . .	+44 38 52.8	−11 40.4	. . .	9.999 275	− 5 51 58.7
132	Montreal	+45 30 17.0	−11 40.4	67	9.999 258	− 0 13 57.15
133	Moscow	+55 45 19.8	−10 52.5	150	9.999 005	− 7 38 32.87
134	Mount Hamilton .	+37 20 25.6	−11 14.9	1283	9.999 548	+ 2 58 19.11
135	Mount Wilson . .	+34 12 59.5	−10 50.6	1800	9.999 660	+ 2 43 58.55

No.	Longitude from Greenwich.		Reduction from Gr. Sid. Time of Mean Noon to Local S. T. M. N.	Description.
	In Time.	In Arc.		
	h m s	° ′ ″	s	
91	−1 6 24.7	− 16 36 10.5	−10.91	Astrophysical Obs., near Steinamanger.
92	−7 36 41.86	−114 10 27.9	−75.01	British Colonial Observatory.
93	+6 6 6.	+ 91 31 30.	+60.14	Obs. of the State Univ. of Iowa.
94	+5 5 55.99	+ 76 28 59.9	+50.26	Observatory of Cornell University.
95	+5 11 29.48	+ 77 52 22.2	+51.17	Mr. Hall's Observatory, Montego Bay.
96	−0 46 20.27	− 11 35 4.0	− 7.61	University Observatory.
97	−0 46 22.0	− 11 35 30.0	− 7.62	Dr Winkler's Observatory.
98	−1 15 54.34	− 18 58 35.1	−12.47	Haynald Obs., Hungary.
99	−0 33 36.4	− 8 24 6.0	− 5.52	Transferred to Heidelberg in 1896.
100	−3 15 16.5	− 48 49 7.5	−32.08	Englehart Obs. of the Imperial University.
101	+0 1 15.1	+ 0 18 46.5	+ 0.21	Meteorological Obs., Kew Gardens, London.
102	−0 40 35.55	− 10 8 53.3	− 6.67	Old position of Transi Circle, 0″.9 N., $0^{s}.12$ E.
103	−2 2 0.64	− 30 30 9.6	−20.04	Imperial University Observatory.
104	−1 18 11.7	− 19 32 55.5	−12.85	Near Aszód, Hungary
105	−1 21 59.04	− 20 29 45.6	−13.47	Royal University Observatory.
106	−0 56 31.59	− 14 7 53.9	− 9.29	Obs. of the Benedictines, Austria.
107	+3 51 37.0	+ 57 54 15.0	+38.05	Obs. Nat. Univ., Argentine Republic.
108	+6 20 58.	+ 95 14 30.	+62.58	Obs. of the State Univ. of Kansas.
109	−0 17 56.17	− 4 29 2.6	− 2.95	University Observatory.
110	−0 49 33.98	− 12 23 29.7	− 8.14	University Observatory.
111	−0 22 15.2	− 5 33 48.0	− 3.66	University Observatory, Cointe.
112	+0 36 44.68	+ 9 11 10.2	+ 6.04	Royal Astronomical Obs., Tapada.
113	+0 12 17.33	+ 3 4 20.0	+ 2.02	Bidston, Birkenhead.
114	−0 52 45.01	− 13 11 15.1	− 8.67	Royal Observatory of the University.
115	−0 57 52.41	− 14 28 6.1	− 9.51	Manora Observatory, Austria.
116	−0 19 8.55	− 4 47 8.3	− 3.14	Obs. of the Univ., St. Genis, Laval.
117	+5 57 37.93	+ 89 24 29.0	+58.75	Washburn Obs. of Univ. of Wisconsin.
118	−5 20 59.12	− 80 14 46.8	−52.73	Founded by East India Company.
119	+0 14 45.12	+ 3 41 16.8	+ 2.42	Ast. and Meteorological Observatory.
120	−8 3 50.	−120 57 30.	−79.48	Meteorological Observatory.
121	+8 9 5.6	+122 16 24.0	+80.35	U. S. Naval Observatory.
122	+0 33 48.4	+ 8 27 6.0	+ 5.55	Obs. of Col. Cooper near Collooney.
123	−0 21 34.59	− 5 23 38.9	− 3.54	National Obs., Univ of Aix-Marseilles.
124	−3 50 12.6	− 57 33 9.0	−37.82	Royal Alfred Observatory, Port-Louis.
125	−9 39 54.0	−144 58 30.0	−95.26	State Obs.; transf. from Williamstown in 1861
126	−0 8 55.6	− 2 13 54.0	− 1.47	Seine-et-Oise, near Paris.
127	+4 50 37.18	+ 72 39 17.7	+47.74	Wesleyan University Observatory.
128	−0 36 45.92	− 9 11 28.8	− 6.04	Royal Observatory Brera.
129	+6 12 56.84	+ 93 14 12.6	+61.27	Obs. of the State University of Minnesota.
130	−9 24 30.75	−141 7 41.3	−92.74	International Latitude Observatory, Japan.
131	−0 43 42.9	− 10 55 43.5	− 7.18	Ducal Observatory.
132	+4 54 18.63	+ 73 34 39.4	+48.35	McGill University Observatory.
133	−2 30 17.09	− 37 34 16.3	−24.69	Obs. of the Imperial University, Presnia.
134	+8 6 34.89	+121 38 43.3	+79.93	Lick Obs. of the University of California.
135	+7 52 14.33	+118 3 34.9	+77.58	Solar Observatory, near Pasadena, Cal.

No.	Place.	Geographic Latitude.			Reduction to Geocentric Latitude.		Altitude (Meters).	Log ρ (Including altitude).	Longitude from Washington.		
		°	′	″	′	″			h	m	s
136	Munich, Bavaria .	+48	8	45.5	−11	36.5	528	9.999 222	− 5	54	41.85
137	Naples	+40	51	46.3	−11	32.8	154	9.999 382	− 6	5	17.51
138	Nashville, Tenn. .	+36	8	54.4	−11	6.6	. . .	9.999 490	+ 0	38	56.4
139	Natal, S. Africa .	−29	50	46.6	+10	3.7	79	9.999 642	− 7	12	16.96
140	Neuchâtel . . .	+47	0	1.2	−11	38.9	488	9.999 248	− 5	36	5.71
141	New Brunswick, N. J.	+40	30	0.6	−11	31.5	21	9.999 384	− 0	10	29.4
142	New Haven, Conn.	+41	19	22.3	−11	34.4	40	9.999 364	− 0	16	35.20
143	New York . . .	+40	45	23.1	−11	32.4	25	9.999 377	− 0	12	22.14
144	Nice, France . .	+43	43	16.9	−11	39.6	376	9.999 325	− 5	37	27.96
145	Nikolaieff, Russia .	+46	58	21.8	−11	38.9	55	9.999 220	− 7	16	9.58
146	Northampton, Mass.	+42	19	2	−11	37.2	81	9.999 340	− 0	17	42.7
147	Northfield, Minn. .	+44	27	41.6	−11	40.3	320	9.999 302	+ 1	4	20.03
148	Oakland, Cal. . .	+37	48	5	−11	17.9	11	9.999 450	+ 3	0	50.77
149	Odessa, Russia . .	+46	28	37.9	−11	39.6	. . .	9.999 228	− 7	11	18.0
150	Odessa, Russia . .	+46	28	36.7	−11	39.6	55	9.999 232	− 7	11	17.88
151	O-Gyalla, Hungary	+47	52	27.3	−11	37.1	113	9.999 200	− 6	21	1.32
152	Omaha, Nebr. . .	+41	16	5.6	−11	34.3	344	9.999 384	+ 1	15	31.18
153	Oncativo, Arg. Rep.	−31	55	10	+10	27.8	280	9.999 610	− 0	53	31.0
154	Ottawa, Canada .	+45	23	30	−11	40.4	85	9.999 262	− 0	5	22
155	Orono	+44	53	58	−11	40.4	41	9.999 272	− 0	33	35.5
156	Oxford, Miss. . .	+34	22	12.6	−10	52.0	. . .	9.999 533	+ 0	49	51.3
157	Oxford, Eng. . .	+51	45	35.4	−11	21.6	65	9.999 098	− 5	3	13.2
158	Oxford, Eng. . .	+51	45	34.2	−11	21.6	64	9.999 098	− 5	3	15.4
159	Padua, Italy . .	+45	24	5	−11	40.4	30	9.999 258	− 5	55	44.97
160	Palermo, Italy . .	+38	6	44.0	−11	19.7	72	9.999 447	− 6	1	41.68
161	Paramatta, N. S. W.	−33	48	49.8	+10	46.9	. . .	9.999 546	+ 8	47	44.0
162	Paris	+48	50	11.2	−11	34.5	61	9.999 172	− 5	17	36.75
163	Perth	−31	57	8.9	+10	28.1	61	9.999 594	+11	8	22.48
164	Philadelphia . .	+39	58	2.1	−11	29.2	74	9.999 400	− 0	7	9.2
165	Pola, Austria . .	+44	51	48.7	−11	40.4	30	9.999 272	− 6	3	38.67
166	Potsdam . . .	+52	22	56.0	−11	17.9	97	9.999 085	− 6	0	31.7
167	Poughkeepsie, N. Y.	+41	41	18	−11	35.5	46	9.999 354	− 0	12	42.13
168	Prague, Bohemia .	+50	5	15.8	−11	29.8	197	9.999 149	− 6	5	56.1
169	Princeton, N. J. .	+40	20	55.8	−11	30.9	50	9.999 389	− 0	9	36.34
170	Providence R. I. .	+41	50	21	−11	35.9	64	9.999 352	− 0	22	39.83
171	Pulkowa, Russia .	+59	46	18.7	−10	10.4	74	9.998 907	− 7	9	34.42
172	Quebec, Canada .	+46	47	59.2	−11	39.2	90	9.999 226	− 0	23	23.14
173	Quito	− 0	14	0	+ 0	5.7	2908	0.000 198	+ 0	5	50.88
174	Riga, Russia . .	+56	57	9.3	−10	41.3	. . .	9.998 967	− 6	44	43.95
175	Rio de Janeiro . .	−22	54	23.6	+ 8	21.1	61	9.999 783	− 2	15	34.4
176	Rome	+41	53	53.6	−11	36.1	51	9.999 350	− 5	58	11.33
177	Rome	+41	53	33.5	−11	36.0	65	9.999 350	− 5	58	12.15
178	Rome	+41	54	4.8	−11	36.1	100	9.999 353	− 5	58	5.25
179	San Fernando . .	+36	27	42.0	−11	8.9	30	9.999 485	− 4	43	26.6
180	San Francisco . .	+37	47	27.9	−11	17.8	. . .	9.999 450	+ 3	1	27.08

No.	Longitude from Greenwich.		Reduction from Gr. Sid. Time of Mean Noon to Local S. T. M. N.	Description.
	In Time.	In Arc.		
	h m s	° ′ ″	s	
136	− 0 46 26.07	− 11 36 31.0	− 7.63	Royal Observatory.
137	− 0 57 1.73	− 14 15 26.0	− 9.37	Royal Obs., Capo di Monte.
138	+ 5 47 12.2	+ 86 48 3.0	+57.04	Observatory of Vanderbilt University.
139	− 2 4 1.18	− 31 0 17.7	−20.37	Government Observatory, Durban.
140	− 0 27 49.93	− 6 57 29.0	− 4.57	Cantonal Observatory, Switzerland.
141	+ 4 57 46.4	+ 74 26 36	+48.92	Schank Obs., Rutgers College.
142	+ 4 51 40.58	+ 72 55 8.7	+47.92	Yale University Obs., Old Obs. 45″.8 S., $1^{s}.58$ W
143	+ 4 55 53.64	+ 73 58 24.6	+48.61	Columbia University Observatory.
144	− 0 29 12.18	− 7 18 2.7	− 4.80	Mt. Gros, near Nice.
145	− 2 7 53.80	− 31 58 27.0	−21.01	Naval Observatory.
146	+ 4 50 33.1	+ 72 38 16.5	+47.73	Smith College Observatory.
147	+ 6 12 35.81	+ 93 8 57.1	+61.21	Goodsell Observatory of Carleton College.
148	+ 8 9 6.55	+122 16 38.3	+80.35	Chabot University.
149	− 2 3 2.18	− 30 45 32.7	−20.21	Branch of Pulkowa Observatory.
150	− 2 3 2.10	− 30 45 31.5	−20.21	University Observatory.
151	− 1 12 45.54	− 18 11 23.1	−11.95	Royal Astrophysical Observatory.
152	+ 6 23 46.96	+ 95 56 44.4	+63.05	Creighton University Observatory.
153	+ 4 14 44.8	+ 63 41 12.0	+41.85	International Latitude Observatory.
154	+ 5 2 54	+ 75 43 30	+49.76	Dominion Observatory.
155	+ 4 34 40.3	+ 68 40 4.5	+45.12	Observatory of the University of Maine.
156	+ 5 58 7.1	+ 89 31 46.5	+58.83	Observatory of the University of Mississippi.
157	+ 0 5 2.6	+ 1 15 39.0	+ 0.83	Radcliffe Observatory.
158	+ 0 5 0.4	+ 1 15 6.0	+ 0.82	University Observatory.
159	− 0 47 29.19	− 11 52 17.9	− 7.80	Royal University Observatory.
160	− 0 53 25.90	− 13 21 28.5	− 8.78	Royal Observatory.
161	−10 4 0.2	−151 0 3.0	−99.22	Formerly Brisbane's Observatory.
162	− 0 9 20.97	− 2 20 14.6	− 1.53	National Observatory of Paris.
163	− 7 43 21.74	−115 50 26.1	−76.12	State Observatory, West Australia.
164	+ 5 1 6.6	+ 75 16 39.0	+49.46	Flower Observatory, University of Pennsylvania
165	− 0 55 22.89	− 13 50 43.3	− 9.10	Obs. of the Imperial Hydrographic Office.
166	− 0 52 15.9	− 13 3 58.5	− 8.59	Royal Astrophysical Observatory.
167	+ 4 55 33.65	+ 73 53 24.7	+48.55	Vassar College Observatory.
168	− 0 57 40.3	− 14 25 4.5	− 9.47	Royal Observatory of the University.
169	+ 4 58 39.44	+ 74 39 51.6	+49.06	Halsted Observatory of Princeton University.
170	+ 4 45 35.95	+ 71 23 59.3	+46.92	Ladd Observatory of Brown University.
171	− 2 1 18.64	− 30 19 39.6	−19.93	Obs. Central Nicolas, near St. Petersburg.
172	+ 4 44 52.64	+ 71 13 9.6	+46.80	Bonner's Hill.
173	+ 5 14 6.66	+ 78 31 39.9	+51.60	National Observatory of Ecuador.
174	− 1 36 28.17	− 24 7 2.6	−15.85	Polytechnic School Observatory.
175	+ 2 52 41.4	+ 43 10 21.0	+28.37	National Observatory of Brazil.
176	− 0 49 55.55	− 12 28 53.3	− 8.20	Royal Observatory at Roman College.
177	− 0 49 56.37	− 12 29 5.6	− 8.20	Royal University Observatory at Capitol.
178	− 0 49 49.47	− 12 27 22.0	− 8.18	Vatican Observatory.
179	+ 0 24 49.2	+ 6 27 18.0	+ 4.08	Naval Observatory, near Cadiz, Spain.
180	+ 8 9 42.86	+122 25 42.9	+80.45	Davidson Observatory.

No.	Place.	Geographic Latitude.	Reduction to Geocentric Latitude.	Altitude (Meters).	Log ρ (Including altitude).	Longitude from Washington.
		° ′ ″	′ ″			h m s
181	San Luis, Arg. Rep.	−33 18 0	+10 42.0	800	9.999 614	− 0 42 52
182	Santiago . . .	−33 26 42.0	+10 43.4	519	9.999 590	− 0 25 29.56
183	South Hadley, Mass.	+42 15 18.2	−11 37.0	76	9.999 342	− 0 17 55.49
184	St. Louis, Mo. . .	+38 38 3.0	−11 22.7	. . .	9.999 429	+ 0 52 33.48
185	St. Petersburg . .	+59 56 32.0	−10 8.4	4	9.998 898	− 7 9 27.2
186	Stockholm . . .	+59 20 33.0	−10 15.5	44	9.998 915	− 6 20 29.77
187	Stonyhurst, Eng. .	+53 50 40	−11 8.0	116	9.999 050	− 4 58 23.10
188	Strassburg, Alsace .	+48 35 0.3	−11 35.3	144	9.999 184	− 5 39 20.47
189	Sydney, N. S. W. .	−33 51 41.1	+10 47.3	44	9.999 548	+ 8 46 54.68
190	Syracuse, N. Y. .	+43 2 13.1	−11 38.6	160	9.999 328	− 0 3 42.42
191	Tacubaya . . .	+19 24 17.5	− 7 17.8	2280	9.999 994	+ 1 28 30.75
192	Taschkent . . .	+41 19 31.3	−11 34.4	457	9.999 392	− 9 45 26.58
193	Taunton, Mass. . .	+41 54 0	−11 36.1	8	9.999 347	− 0 23 56
194	Teramo	+42 39 27	−11 37.9	398	9.999 354	− 6 3 12
195	Tokio, Japan . .	+35 39 17.5	−11 2.8	. . .	9.999 502	+ 9 32 46.20
196	Toronto, Canada .	+43 39 35.9	−11 39.6	108	9.999 308	+ 0 9 18.87
197	Toulouse, France .	+43 36 45	−11 39.5	194	9.999 315	− 5 14 5.66
198	Trieste, Austria .	+45 38 45.4	−11 40.3	67	9.999 255	− 6 3 18.73
199	Troy, N. Y. . . .	+42 43 52.9	−11 38.1	. . .	9.999 325	− 0 13 33.49
200	Tschardjui . . .	+39 8 10.7	−11 25.4	167	9.999 427	− 9 22 13.1
201	Tulse Hill . . .	+51 26 47.0	−11 23.3	48	9.999 105	− 5 7 48.1
202	Turin	+45 4 8.0	−11 40.4	276	9.999 284	− 5 39 2.96
203	Tuscaloosa . . .	+33 12 36.8	−10 41.1	. . .	9.999 561	+ 0 41 55.96
204	Ukiah, Cal. . . .	+39 8 12.1	−11 25.4	220	9.999 431	+ 3 3 53
205	Upsala, Sweden .	+59 51 29.4	−10 9.3	21	9.998 901	− 6 18 45.93
206	Urbana	+40 6 20.2	−11 29.8	236	9.999 408	+ 0 44 38.2
207	Utrecht, Holland .	+52 5 9.6	−11 19.7	13	9.999 087	− 5 28 46.8
208	Venice	+45 26 10.5	−11 40.4	15	9.999 256	− 5 57 37.90
209	Vienna	+48 13 55.4	−11 36.2	240	9.999 199	− 6 13 37.17
210	Vienna	+48 12 53.8	−11 36.2	214	9.999 198	− 6 13 41.1
211	Vienna	+48 12 46.7	−11 36.2	280	9.999 202	− 6 13 26.89
212	Warsaw	+52 13 4.7	−11 18.9	110	9.999 090	− 6 32 23.06
213	Washington . . .	+38 55 14.0	−11 24.2	82	9.999 428	0 0 0.00
214	Washington . . .	+38 53 38.8	−11 24.1	31	9.999 424	− 0 0 3.63
215	Washington . . .	+38 53 17.3	−11 24.1	0	9.999 422	− 0 0 9.6
216	Washington . . .	+38 56 14.8	−11 24.2	. . .	9.999 422	− 0 0 15.78
217	Wellesley, Mass. .	+42 17 43	−11 37.1	61	9.999 340	− 0 23 3
218	Wellington . . .	−41 18 0.6	+11 34.3	47	9.999 364	+ 7 12 37.70
219	West Point . . .	+41 23 22.1	−11 34.6	170	9.999 371	− 0 12 25.23
220	Wilhelmshaven .	+53 31 52.2	−11 10.3	8	9.999 051	− 5 40 50.89
221	Williams Bay, Wis.	+42 34 12.6	−11 37.7	335	9.999 352	+ 0 45 57.46
222	Williamstown, Mass.	+42 42 30	−11 38.0	213	9.999 340	− 0 15 26
223	Windsor, N. S. W. .	−33 36 30.8	+10 44.9	16	9.999 552	+ 8 48 23.7
224	Zô-Sè	+31 5 47.7	−10 18.6	100	9.999 617	+10 46 59.5
225	Zürich	+47 22 40.0	−11 38.2	470	9.999 237	− 5 42 28.08

No.	Longitude from Greenwich.		Reduction from Gr. Sid. Time of Mean Noon to Local S. T. M. N.	Description.
	In Time.	In Arc.		
	h m s	° ′ ″	s	
181	+ 4 25 24	+ 66 21 0	+ 43.60	Southern Observatory of Carnegie Institution.
182	+ 4 42 46.22	+ 70 41 33.3	+ 46.45	National Obs. of Chile. Old Obs. 16″.6 N., $9^{s}.5$ E.
183	+ 4 50 20.29	+ 72 35 4.3	+ 47.70	Observatory of Mt. Holyoke College.
184	+ 6 0 49.26	+ 90 12 18.9	+ 59.27	Washington University Observatory.
185	− 2 1 11.4	− 30 17 51.0	− 19.91	Imperial University Observatory.
186	− 1 12 13.99	− 18 3 29.9	− 11.87	Observatory of Academy of Science.
187	+ 0 9 52.68	+ 2 28 10.2	+ 1.62	Stonyhurst College Observatory, near Blackburn.
188	− 0 31 4.69	− 7 46 10.3	− 5.11	Imperial University Observatory.
189	−10 4 49.54	−151 12 23.1	− 99.36	Government Observatory, South Australia.
190	+ 5 4 33.36	+ 76 8 20.4	+ 50.03	Observatory of Syracuse University.
191	+ 6 36 46.53	+ 99 11 38.0	+ 65.18	National Observatory of Mexico.
192	− 4 37 10.80	− 69 17 42.0	− 45.53	Turkestan, Russia.
193	+ 4 44 20	+ 71 5 0	+ 46.71	Mr Metcalf's Observatory.
194	− 0 54 56	− 13 44 0	− 9.02	At Collurania, near Teramo, Italy.
195	− 9 18 58.02	−139 44 30.3	− 91.82	University Observatory.
196	+ 5 17 34.65	+ 79 23 39.7	+ 52.17	University Observatory.
197	− 0 5 49.88	− 1 27 28.2	− 0.96	University Observatory.
198	− 0 55 2.95	− 13 45 44.3	− 9.04	Imperial Maritime Observatory.
199	+ 4 54 42.29	+ 73 40 34.3	+ 48.41	Observatory Rensselaer Polytechnic Institute.
200	− 4 13 57.3	− 63 29 19.5	− 41.72	International Latitude Obs., Turkestan.
201	+ 0 0 27.7	+ 0 6 55.5	+ 0.08	Observatory of Sir W. Huggins, London.
202	− 0 30 47.18	− 7 41 47.7	− 5.06	Royal Observatory, Palazzo Madama.
203	+ 5 50 11.74	+ 87 32 56.1	+ 57.53	Observatory of the University of Alabama.
204	+ 8 12 9	+123 2 15	+ 80.85	International Latitude Observatory.
205	− 1 10 30.15	− 17 37 32.3	− 11.58	University Observatory.
206	+ 5 52 54.0	+ 88 13 30	+ 57.97	Observatory of the University of Illinois.
207	− 0 20 31.0	− 5 7 45.0	− 3.37	University Observatory, Sonnenborgh.
208	− 0 49 22.12	− 12 20 31.8	− 8:11	Observatory of the Nautical Institute.
209	− 1 5 21.39	− 16 20 20.9	− 10.74	Imperial Univ. Obs. Old Obs. 1′ 20″ S., $10^{s}.25$ E.
210	− 1 5 25.3	− 16 21 19.5	− 10.75	Oppolzer Observatory, Joseph Stadt.
211	− 1 5 11.11	− 16 17 46.7	− 10.71	Kuffner Observatory, Ottakring.
212	− 1 24 7.28	− 21 1 49.2	− 13.82	Imperial University Observatory.
213	+ 5 8 15.78	+ 77 3 56.7	+ 50.64	U S. Naval Observatory, Georgetown Heights.
214	+ 5 8 12.15	+ 77 3 2.3	+ 50.63	Old U. S. Naval Observatory. 842–1893.
215	+ 5 8 6.2	+ 77 1 33.0	+ 50.61	Smithsonian Astrophysical Observatory.
216	+ 5 8 0.0	+ 77 0 0.0	+ 50.60	Catholic University Obs., Brookland, D. C.
217	+ 4 45 13	+ 71 18 15	+ 46.85	Whitin Observatory of Wellesley College.
218	−11 39 6.52	−174 46 37.8	−114.85	Colonial Time Service-Obs. of New Zealand.
219	+ 4 55 50.55	+ 73 57 38.3	+ 48.60	U S. Military Academy Old Obs. 9″ N., $1^{s}.2$ E.
220	− 0 32 35.11	− 8 8 46.7	− 5.35	Imperial Naval Observatory of Germany.
221	+ 5 54 13.24	+ 88 33 18.6	+ 58.19	Yerkes Observatory of University of Chicago.
222	+ 4 52 50	+ 73 12 30	+ 48.10	Field Memorial Observatory, Williams College.
223	−10 3 20.5	−150 50 7.5	− 99.11	M . John Tebbutt's Observatory.
224	− 8 4 44.7	−121 11 10.5	− 79.63	Obs. of the Jesuits near Shanghai, China.
225	− 0 34 12.30	− 8 33 4.5	− 5.62	Observatory of the Polytechnic School.

LUNAR DISTANCES.

THE COMPUTATION OF LUNAR DISTANCES.

The tables of lunar distances formerly given on Pages XIII to XVIII, inclusive, for each month of the Greenwich Ephemeris, are omitted, as it has been decided by the authorities of the Navy Department that they are now of little practical use to navigators. However, in case it is desired to use this method, the angular distance between the Moon and any heavenly body may be calculated by solving the spherical triangle of which the known parts are the polar distances of the Moon and the other body and the difference of their right ascensions, or, in other words, the angle at the pole between their hour circles. Then, the Greenwich mean time of the observation being approximately known, and the lunar distances for the star or other body calculated for the even hour before and after, the required lunar distance may be interpolated and the longitude derived by the methods given in Bowditch and other books on navigation.

EXAMPLE.

Find the lunar distance of Aldebaran January 3, 1912, at 3^h P. M. Greenwich Mean Time.

Let α and δ = Right Ascension and Declination of the star
" α' and δ' = " " " " " " Moon
" D = Lunar Distance
Also let $\tan M = \tan \delta' \sec (\alpha' - \alpha)$
Then $\cos D = \sin \delta' \cos (M - \delta)$ $\operatorname{cosec} M$

$$\begin{array}{rrrr} & h & m & s \\ \alpha = & 4 & 30 & 52.8 \\ \alpha' = & 8 & 9 & 53.4 \\ \alpha' - \alpha = + & 3 & 39 & 0.6 \\ \alpha' - \alpha = + & 54^\circ & 45' & 9'' \\ \delta' = + & 25 & 13 & 50 \end{array}$$

$\tan \delta' = 9.673\ 220$
$\sec (\alpha' - \alpha) = 0.238\ 742$
$\tan M = 9.911\ 962$

$$\begin{array}{rrrr} & {}^\circ & ' & '' \\ M = & 39 & 13 & 55 \\ \delta = & +16 & 20 & 7 \\ M - \delta = & 22 & 53 & 48 \end{array}$$

$\sin \delta' = 9.629\ 676$
$\cos (M - \delta) = 9.964\ 358$
$\operatorname{cosec} M = 0.198\ 966$
$\cos D = 9.793\ 000$
$D = 51^\circ\ 37'\ 13''$

TABLE I.

POLARIS FOR THE 90TH MERIDIAN WEST OF GREENWICH.

Astr. Date.	App. R. A.	App. Decl.	Mean Central Time of—		Mean Central Time (for Lat. 45°) of—		Sid. Time of Mean Noon at Greenwich.*
	Upper Culm.	Upper Culm.	Upper Culm.	Lower Culm.	West Elong.	East Elong.	
	h m	° ′					
1912.	1 26	88 50					
	s	″	h m s	h m s	h m	h m	h m s
Jan. 1	98.5	30.8	6 46 25	18 44 27	12 40.8	0 52.0	18 39 7.5
3	96.7	31.1	6 38 31	18 36 33	12 32.9	0 44.1	18 47 0.7
5	94.6	31.5	6 30 37	18 28 39	12 25.0	0 36.2	18 54 53.8
7	92.2	31.7	6 22 43	18 20 45	12 17.1	0 28.3	19 2 46.9
9	89.9	31.9	6 14 49	18 12 51	12 9.2	0 20.4	19 10 40.0
11	87.8	31.9	6 6 55	18 4 57	12 1.3	0 12.5	19 18 33.1
13	85.9	32.0	5 59 2	17 57 3	11 53.4	0 4.6	19 26 26.2
15	84.0	32.1	5 51 8	17 49 9	11 45.5	23 52.8	19 34 19.4
17	82.0	32.2	5 43 14	17 41 15	11 37.6	23 44.9	19 42 12.5
19	79.7	32.3	5 35 20	17 33 21	11 29.7	23 37.0	19 50 5.6
← 21	77.3	32.4	5 27 26	17 25 27	11 21.8	23 29.1	19 57 58.7
23	74.9	32.3	5 19 32	17 17 33	11 13.9	23 21.2	20 5 51.8
25	72.7	32.2	5 11 38	17 9 39	11 6.0	23 13.3	20 13 44.9
27	70.8	32.1	5 3 44	17 1 45	10 58.1	23 5.4	20 21 38.0
29	69.1	32.0	4 55 50	16 53 52	10 50.2	22 57.5	20 29 31.2
31	67.1	32.0	4 47 56	16 45 58	10 42.3	22 49.6	20 37 24.3
Feb. 2	64.9	32.0	4 40 2	16 38 4	10 34.4	22 41.7	20 45 17.4
4	62.5	31.9	4 32 8	16 30 10	10 26.5	22 33.8	20 53 10.5
6	60.3	31.6	4 24 14	16 22 16	10 18.6	22 25.9	21 1 3.6
8	58.4	31.3	4 16 20	16 14 22	10 10.7	22 18.0	21 8 56.7
10	56.7	31.1	4 8 27	16 6 28	10 2.8	22 10.1	21 16 49.8
12	55.0	30.8	4 0 33	15 58 35	9 55.0	22 2.2	21 24 43.0
14	53.2	30.6	3 52 40	15 50 41	9 47.1	21 54.3	21 32 36.1
16	51.2	30.4	3 44 46	15 42 48	9 39.2	21 46.4	21 40 29.2
18	49.1	30.0	3 36 52	15 34 54	9 31.3	21 38.5	21 48 22.3
20	47.2	29.7	3 28 58	15 27 0	9 23.4	21 30.6	21 56 15.4
22	45.5	29.2	3 21 5	15 19 6	9 15.5	21 22.7	22 4 8.5
24	44.1	28.8	3 13 12	15 11 13	9 7.6	21 14.8	22 12 1.6
26	42.8	28.4	3 5 18	15 3 20	8 59.7	21 7.0	22 19 54.7
28	41.3	28.1	2 57 25	14 55 27	8 51 8	20 59.1	22 27 47.8
Mar. 1	39.6	27.7	2 49 32	14 47 33	8 43.9	20 51.2	22 35 40.9
3	37.9	27.2	2 41 38	14 39 40	8 36.0	20 43.3	22 43 34.0
5	36.5	26.7	2 33 45	14 31 47	8 28.1	20 35.4	22 51 27.2
7	35.4	26.1	2 25 52	14 23 54	8 20.3	20 27.5	22 59 20.3
9	34.4	25.6	2 17 59	14 16 1	8 12.4	20 19.6	23 7 13.4
11	33.5	25.1	2 10 6	14 8 8	8 4.5	20 11.8	23 15 6.5
13	32.4	24.6	2 2 14	14 0 15	7 56.6	20 3.9	23 22 59.6
15	31.2	24.1	1 54 21	13 52 22	7 48.7	19 56.0	23 30 52.7
17	30.0	23.6	1 46 28	13 44 29	7 40.9	19 48.1	23 38 45.8
19	29.0	22.9	1 38 35	13 36 37	7 33.0	19 40.2	23 46 38.9
21	28.3	22.3	1 30 42	13 28 44	7 25.1	19 32.4	23 54 32.0
23	28.0	21.7	1 22 50	13 20 52	7 17.2	19 24.5	0 2 25.1
25	27.6	21.1	1 14 58	13 13 0	7 9.4	19 16.6	0 10 18.2
27	27.0	20.6	1 7 5	13 5 7	7 1.5	19 8.8	0 18 11.3
29	26.3	20.1	0 59 13	12 57 15	6 53.6	19 0.9	0 26 4.4
31	25.7	19.5	0 51 21	12 49 22	6 45.7	18 53.0	0 33 57.6
Apr. 2	25.4	18.8	0 43 29	12 41 30	6 37.8	18 45.2	0 41 50.7
4	25.4	18.1	0 35 37	12 33 38	6 30.0	18 37.3	0 49 43.8
6	25.5	17.5	0 27 45	12 25 47	6 22.1	18 29.4	0 57 36.9
8	25.6	17.0	0 19 53	12 17 55	6 14.3	18 21.6	1 5 30.0

For the corrections necessary to reduce to the times of west and east elongations for latitude other than 45°, see Table Ia.

***Use Table III for interpolation for longitude from Greenwich. These times are given to two decimal and for each day on page II of the Greenwich Ephemeris.**

TABLE I.

LARIS FOR THE 90TH MERIDIAN WEST OF GREENWICH.

Astr. Date.	App. R. A.	App. Decl.	Mean Central Time of—		Mean Central Time (for Lat. 45°) of—		Sid. Time of Mear Noon at Greenwich.*
	Upper Culm.	Upper Culm.	Upper Culm.	Lower Culm.	West Elong.	East Elong.	
	h m	° ′					
1912.	1 26	88 50					
	s	″	h m s	h m s	h m	h m	h m s
Apr. 10	25.5	16.4	0 12 1	12 10 3	6 6.4	18 13.7	1 13 23.1
12	25.4	15.8	0 4 9	12 2 11	5 58.5	18 5.8	1 21 16.2
14	25.4	14.9	23 52 22	11 54 20	5 50.7	17 58.0	1 29 9.3
16	25.8	14.2	23 44 30	11 46 28	5 42.8	17 50.1	1 37 2.4
18	26.5	13.6	23 36 39	11 38 37	5 35.0	17 42.3	1 44 55.5
20	27.2	13.0	23 28 48	11 30 46	5 27.1	17 34.4	1 52 48.6
22	27.8	12.5	23 20 57	11 22 55	5 19.3	17 26.6	2 0 41.8
24	28.2	12.0	23 13 5	11 15 3	5 11.4	17 18.7	2 8 34.9
26	28.6	11.4	23 5 14	11 7 12	5 3.6	17 10.9	2 16 28.0
28	29.3	10.8	22 57 23	10 59 21	4 55.7	17 3.0	2 24 21.1
30	30.3	10.2	22 49 32	10 51 30	4 47.8	16 55.2	2 32 14.2
May 2	31.5	9.7	22 41 41	10 43 39	4 40.0	16 47.3	2 40 7.3
4	32.7	9.2	22 33 51	10 35 49	4 32.1	16 39.5	2 48 0.4
6	33.7	8.7	22 26 0	10 27 58	4 24.3	16 31.6	2 55 53.5
8	34.6	8.3	22 18 9	10 20 7	4 16.4	16 23.8	3 3 46.6
10	35.5	7.8	22 10 18	10 12 16	4 8.6	16 15.9	3 11 39.8
12	36.6	7.2	22 2 27	10 4 25	4 0.7	16 8.1	3 19 32.9
14	38.1	6.7	21 54 37	9 56 35	3 52.9	16 0.2	3 27 26.0
16	39.8	6.2	21 46 47	9 48 45	3 45.1	15 52.4	3 35 19.1
18	41.5	5.9	21 38 57	9 40 54	3 37.2	15 44.6	3 43 12.2
20	42.9	5.6	21 31 6	9 33 4	3 29.4	15 36.7	3 51 5.3
22	44.1	5.3	21 23 16	9 25 13	3 21.5	15 28.9	3 58 58.4
24	45.4	4.8	21 15 25	9 17 23	3 13.7	15 21.0	4 6 51.6
26	47.1	4.4	21 7 35	9 9 33	3 5.9	15 13.2	4 14 44.7
28	49.1	4.0	20 59 45	9 1 43	2 58.0	15 5.4	4 22 37.8
30	51.0	3.7	20 51 55	8 53 53	2 50.2	14 57.5	4 30 30.9
June 1	52.9	3.5	20 44 5	8 46 3	2 42.4	14 49.7	4 38 24.0
3	54.6	3.3	20 36 15	8 38 13	2 34.5	14 41.9	4 46 17.1
5	56.2	3.1	20 28 25	8 30 23	2 26.7	14 34.0	4 54 10.2
7	57.8	2.8	20 20 35	8 22 33	2 18.9	14 26.2	5 2 3.4
9	59.7	2.5	20 12 45	8 14 42	2 11.0	14 18.4	5 9 56.5
11	61.9	2.2	20 4 55	8 6 53	2 3.2	14 10.5	5 17 49.6
13	64.2	2.1	19 57 6	7 59 3	1 55.4	14 2.7	5 25 42.7
15	66.4	2.0	19 49 16	7 51 13	1 47.5	13 54.9	5 33 35.8
17	68.3	2.0	19 41 26	7 43 24	1 39.7	13 47.1	5 41 29.0
19	70.0	1.9	19 33 36	7 35 34	1 31.9	13 39.2	5 49 22.1
21	71.9	1.7	19 25 46	7 27 44	1 24.1	13 31.4	5 57 15.2
23	74.1	1.6	19 17 56	7 19 54	1 16.2	13 23.6	6 5 8.3
25	76.5	1.5	19 10 7	7 12 5	1 8.4	13 15.7	6 13 1.4
27	78.9	1.5	19 2 17	7 4 15	1 0.6	13 7.9	6 20 54.5
29	81.1	1.6	18 54 28	6 56 25	0 52.7	13 0.1	6 28 47.7
July 1	83.0	1.7	18 46 38	6 48 35	0 44.9	12 52.2	6 36 40.8
3	84.9	1.7	18 38 48	6 40 46	0 37.1	12 44.4	6 44 33.9
5	86.9	1.7	18 30 58	6 32 56	0 29.2	12 36.6	6 52 27.0
7	89.1	1.7	18 23 8	6 25 5	0 21.4	12 28.7	7 0 20.1
9	91.6	1.8	18 15 19	6 17 16	0 13.6	12 20.9	7 8 13.2
11	94.1	2.0	18 7 30	6 9 27	0 5.8	12 13.1	7 16 6.4
13	96.3	2.2	17 59 40	6 1 37	23 54.0	12 5.3	7 23 59.5
15	98.3	2.5	17 51 50	5 53 48	23 46.2	11 57.5	7 31 52.6
17	100.1	2.7	17 44 1	5 45 58	23 38.4	11 49.6	7 39 45.7

For the corrections necessary to reduce to the times of west and east elongations for latitude other than 45°, see Table Ia.

***Use Table III for interpolation for longitude from Greenwich. These times are given to two decimal places *and for each day on page II* of the Greenwich Ephemeris.**

TABLE I.

POLARIS FOR THE 90TH MERIDIAN WEST OF GREENWICH.

Astr. Date.		App. R. A.	App. Decl.	Mean Central Time of—		Mean Central Time (for Lat. 45°) of—		Sid. Time of Mean Noon at Greenwich.*
		Upper Culm.	Upper Culm.	Upper Culm.	Lower Culm.	West Elong.	East Elong.	
		h m	° ′					
1912.		1 27	88 50					
		s	″	h m s	h m s	h m	h m	h m s
July	19	42.2	2.8	17 36 11	5 38 8	23 30.5	11 41.8	7 47 38.8
	21	44.5	3.0	17 28 21	5 30 19	23 22.7	11 34.0	7 55 31.9
	23	46.9	3.2	17 20 32	5 22 29	23 14.9	11 26.1	8 3 25.0
	25	49.2	3.6	17 12 42	5 14 40	23 7.1	11 18.3	8 11 18.2
	27	51.3	3.9	17 4 52	5 6 50	22 59.2	11 10.5	8 19 11.3
	29	53.2	4.3	16 57 2	4 59 0	22 51.4	11 2.7	8 27 4.4
	31	55.0	4.6	16 49 12	4 51 10	22 43.6	10 54.8	8 34 57.5
Aug.	2	56.9	4.9	16 41 23	4 43 20	22 35.8	10 47.0	8 42 50.6
	4	59.0	5.2	16 33 33	4 35 30	22 27.9	10 39.2	8 50 43.7
	6	61.3	5.6	16 25 43	4 27 40	22 20.1	10 31.3	8 58 36.8
	8	63.5	6.1	16 17 54	4 19 51	22 12.3	10 23.5	9 6 30.0
	10	65.5	6.6	16 10 4	4 12 1	22 4.4	10 15.7	9 14 23.1
	12	67.1	7.1	16 2 14	4 4 11	21 56.6	10 7.8	9 22 16.2
	14	68.7	7.5	15 54 24	3 56 21	21 48.8	10 0.0	9 30 9.3
	16	70.6	7.9	15 46 34	3 48 31	21 40.9	9 52.2	9 38 2.4
	18	72.6	8.4	15 38 44	3 40 41	21 33.1	9 44.3	9 45 55.5
	20	74.7	8.9	15 30 54	3 32 52	21 25.3	9 36.5	9 53 48.6
	22	76.6	9.5	15 23 4	3 25 2	21 17.4	9 28.7	10 1 41.7
	24	78.1	10.1	15 15 14	3 17 11	21 9.6	9 20.8	10 9 34.8
	26	79.6	10.7	15 7 23	3 9 21	21 1.8	9 13.0	10 17 28.0
	28	81.0	11.2	14 59 33	3 1 31	20 53.9	9 5.2	10 25 21.1
	30	82.5	11.7	14 51 43	2 53 40	20 46.1	8 57.3	10 33 14.2
Sept.	1	84.2	12.3	14 43 53	2 45 50	20 38.3	8 49.5	10 41 7.3
	3	86.0	12.9	14 36 3	2 38 0	20 30.4	8 41.7	10 49 0.4
	5	87.6	13.6	14 28 13	2 30 10	20 22.6	8 33.8	10 56 53.5
	7	88.9	14.4	14 20 22	2 22 20	20 14.7	8 26.0	11 4 46.6
	9	90.0	15.1	14 12 31	2 14 29	20 6.9	8 18.1	11 12 39.7
	11	91.1	15.7	14 4 40	2 6 38	19 59.0	8 10.3	11 20 32.8
	13	92.4	16.3	13 56 50	1 58 47	19 51.2	8 2.4	11 28 25.9
	15	93.9	16.9	13 49 0	1 50 57	19 43.4	7 54.6	11 36 19.0
	17	95.3	17.7	13 41 9	1 43 7	19 35.5	7 46.8	11 44 12.1
	19	96.4	18.4	13 33 18	1 35 16	19 27.7	7 38.9	11 52 5.2
	21	97.3	19.2	13 25 27	1 27 25	19 19.8	7 31.1	11 59 58.4
	23	98.0	19.9	13 17 36	1 19 34	19 12.0	7 23.2	12 7 51.5
	25	98.7	20.6	13 9 45	1 11 43	19 4.1	7 15.4	12 15 44.6
	27	99.6	21.3	13 1 54	1 3 52	18 56.3	7 7.5	12 23 37.7
	29	100.6	22.0	12 54 4	0 56 1	18 48.5	6 59.7	12 31 30.8
Oct.	1	101.7	22.7	12 46 13	0 48 10	18 40.6	6 51.8	12 39 23.9
	3	102.4	23.6	12 38 22	0 40 19	18 32.8	6 44.0	12 47 17.0
	5	102.8	24.5	12 30 30	0 32 28	18 24.9	6 36.1	12 55 10.1
	7	103.1	25.2	12 22 39	0 24 37	18 17.0	6 28.3	13 3 3.2
	9	103.4	25.9	12 14 47	0 16 45	18 9.2	6 20.4	13 10 56.3
	11	104.1	26.6	12 6 56	0 8 54	18 1.3	6 12.5	13 18 49.4
	13	104.7	27.4	11 59 5	{0 1 8 23 57 7}	17 53.5	6 4.7	13 26 42.6
	15	105.2	28.2	11 51 14	23 49 16	17 45.6	5 56.8	13 34 35.7
	17	105.4	29.1	11 43 22	23 41 24	17 37.8	5 49.0	13 42 28.8
	19	105.4	29.9	11 35 30	23 33 32	17 29.9	5 41.1	13 50 21.9
	21	105.2	30.6	11 27 38	23 25 40	17 22.0	5 33.2	13 58 15.0
	23	105.0	31.3	11 19 46	23 17 48	17 14.2	5 25.4	14 6 8.1
	25	105.1	32.0	11 11 54	23 9 56	17 6.3	5 17.5	14 14 1.2

For the corrections necessary to reduce to the times of west and east elongations for latitude other than 45°, see Table Ia.

***Use Table III for interpolation for longitude from Greenwich. These times are given to two decimal and for each day on page II of the Greenwich Ephemeris.**

TABLE I.

POLARIS FOR THE 90TH MERIDIAN WEST OF GREENWICH.

Astr. Date.		App. R. A.	App. Decl.	Mean Central Time of—		Mean Central Time (for Lat. 45°) of—		Sid. Time of Mean Noon at Greenwich*
		Upper Culm.	Upper Culm.	Upper Culm.	Lower Culm.	West Elong.	East Elong.	
1912.		h m 1 28 s	° ′ 88 50 ″	h m s	h m s	h m	h m	h m s
Oct.	27	45.3	32.8	11 4 3	23 2 5	16 58.4	5 9.6	14 21 54.3
	29	45.3	33.6	10 56 11	22 54 13	16 50.6	5 1.8	14 29 47.4
	31	45.1	34.4	10 48 19	22 46 21	16 42.7	4 53.9	14 37 40.5
Nov.	2	44.5	35.3	10 40 27	22 38 28	16 34.8	4 46.0	14 45 33.6
	4	43.8	36.0	10 32 34	22 30 36	16 27.0	4 38.2	14 53 26.8
	6	43.3	36.7	10 24 42	22 22 44	16 19.1	4 30.3	15 1 19.9
	8	43.0	37.3	10 16 50	22 14 52	16 11.2	4 22.4	15 9 13.0
	10	42.8	38.1	10 8 57	22 6 59	16 3.3	4 14.6	15 17 6.1
	12	42.2	38.9	10 1 5	21 59 7	15 55.5	4 6.7	15 24 59.2
	14	41.4	39.7	9 53 12	21 51 14	15 47.6	3 58.8	15 32 52.3
	16	40.4	40.4	9 45 20	21 43 22	15 39.7	3 50.9	15 40 45.4
	18	39.2	41.0	9 37 27	21 35 29	15 31.8	3 43.1	15 48 38.6
	20	38.2	41.6	9 29 34	21 27 36	15 24.0	3 35.2	15 56 31.7
	22	37.4	42.2	9 21 42	21 19 44	15 16.1	3 27.3	16 4 24.8
	24	36.7	42.9	9 13 49	21 11 51	15 8.2	3 19.4	16 12 17.9
	26	35.7	43.6	9 5 56	21 3 58	15 0.3	3 11.5	16 20 11.0
	28	34.5	44.3	8 58 3	20 56 5	14 52.5	3 3.6	16 28 4.1
	30	32.9	44.9	8 50 10	20 48 12	14 44.6	2 55.8	16 35 57.2
Dec.	2	31.4	45.5	8 42 16	20 40 18	14 36.7	2 47.9	16 43 50.4
	4	30.0	46.0	8 34 23	20 32 25	14 28.8	2 40.0	16 51 43.5
	6	28.9	46.5	8 26 30	20 24 32	14 20.9	2 32.1	16 59 36.6
	8	27.7	47.1	8 18 37	20 16 39	14 13.0	2 24.2	17 7 29.7
	10	26.2	47.7	8 10 44	20 8 45	14 5.1	2 16.3	17 15 22.8
	12	24.4	48.2	8 2 50	20 0 52	13 57.2	2 8.4	17 23 16.0
	14	22.5	48.7	7 54 56	19 52 58	13 49.3	2 0.5	17 31 9.1
	16	20.6	49.1	7 47 3	19 45 4	13 41.5	1 52.6	17 39 2.2
	18	18.9	49.5	7 39 9	19 37 11	13 33.6	1 44.7	17 46 55.3
	20	17.3	49.8	7 31 16	19 29 17	13 25.7	1 36.9	17 54 48.4
	22	15.8	50.2	7 23 22	19 21 24	13 17.8	1 29.0	18 2 41.5
	24	14.1	50.7	7 15 29	19 13 30	13 9.9	1 21.1	18 10 34.7
	26	12.0	51.1	7 7 35	19 5 37	13 2.0	1 13.2	18 18 27.8
	28	9.7	51.5	6 59 41	18 57 43	12 54.1	1 5.3	18 26 20.9
	30	7.6	51.7	6 51 47	18 49 48	12 46.2	0 57.4	18 34 14.0

TABLE Ia.

CORRECTIONS TO THE TIMES OF ELONGATIONS FOR DIFFERENT LATITUDES.

Lat.	W. E.	Lat.	W. E.	Lat.	W. E.	Lat.	W. E.	Lat.	W. E.	Lat.	W. E.
°	m	°	m	°	m	°	m	°	m	°	m
10	+3.8−	20	+3.0−	30	+2.0−	40	+0.8−	50	−0.9+	55	−2.0+
12	3.7	22	2.8	32	1.8	42	0.5	51	1.1	56	2.2
14	3.5	24	2.6	34	1.5	44	+0.2−	52	1.3	57	2.5
16	3.3	26	2.4	36	1.3	46	−0.2+	53	1.5	58	2.8
18	3.1	28	2.2	38	1.0	48	0.6	54	1.8	59	3.1
20	+3.0−	30	+2.0−	40	+0.8−	50	−0.9+	55	−2.0+	60	−3.4+

For the corrections necessary to reduce to the times of west and east elongations for latitude other than 45°, see Table Ia.

*Use Table III for interpolation for longitude from Greenwich. These times are given to two decimal places and for each day on page II of the Greenwich Ephemeris.

TABLE II.—SIDEREAL INTO MEAN SOLAR TIME.

TO BE SUBTRACTED FROM A SIDEREAL TIME INTERVAL.

Side-real.	0^{h}	1^{h}	2^{h}	3^{h}	4^{h}	5^{h}	6^{h}	7^{h}	For Seconds.	
m	m s	m s	m s	m s	m s	m s	m s	m s	s	s
0	0 0.000	0 9.830	0 19.659	0 29.489	0 39.318	0 49.148	0 58.977	1 8.807	0	0.000
1	0 0.164	0 9.993	0 19.823	0 29.653	0 39.482	0 49.312	0 59.141	1 8.971	1	0.003
2	0 0.328	0 10.157	0 19.987	0 29.816	0 39.646	0 49.475	0 59.305	1 9.135	2	0.005
3	0 0.491	0 10.321	0 20.151	0 29.980	0 39.810	0 49.639	0 59.469	1 9.298	3	0.008
4	0 0.655	0.10.485	0 20.314	0 30.144	0 39.974	0 49.803	0 59.633	1 9.462	4	0.011
5	0 0.819	0 10.649	0 20.478	0 30.308	0 40.137	0 49.967	0 59.796	1 9.626	5	0.014
6	0 0.983	0 10.813	0 20.642	0 30.472	0 40.301	0 50.131	0 59.960	1 9.790	6	0.016
7	0 1.147	0 10.976	0 20.806	0 30.635	0 40.465	0 50.295	1 0.124	1 9.954	7	0.019
8	0 1.311	0 11.140	0 20.970	0 30.799	0 40.629	0 50.458	1 0.288	1 10.118	8	0.022
9	0 1.474	0 11.304	0 21.134	0 30.963	0 40.793	0 50.622	1 0.452	1 10.281	9	0.025
10	0 1.638	0 11.468	0 21.297	0 31.127	0 40.956	0 50.786	1 0.616	1 10.445	10	0.027
11	0 1.802	0 11.632	0 21.461	0 31.291	0 41.120	0 50.950	1 0.779	1 10.609	11	0.030
12	0 1.966	0 11.795	0 21.625	0 31.455	0 41.284	0 51.114	1 0.943	1 10.773	12	0.033
13	0 2.130	0 11.959	0 21.789	0 31.618	0 41.448	0 51.278	1 1.107	1 10.937	13	0.035
14	0 2.294	0 12.123	0 21.953	0 31.782	0 41.612	0 51.441	1 1.271	1 11.100	14	0.038
15	0 2.457	0 12.287	0 22.117	0 31.946	0 41.776	0 51.605	1 1.435	1 11.264	15	0.041
16	0 2.621	0 12.451	0 22.280	0 32.110	0 41.939	0 51.769	1 1.599	1 11.428	16	0.044
17	0 2.785	0 12.615	0 22.444	0 32.274	0 42.103	0 51.933	1 1.762	1 11.592	17	0.046
18	0 2.949	0 12.778	0 22.608	0 32.438	0 42.267	0 52.097	1 1.926	1 11.756	18	0.049
19	0 3.113	0 12.942	0 22.772	0 32.601	0 42.431	0 52.260	1 2.090	1 11.920	19	0.052
20	0 3.277	0 13.106	0 22.936	0 32.765	0 42.595	0 52.424	1 2.254	1 12.083	20	0.055
21	0 3.440	0 13.270	0 23.099	0 32.929	0 42.759	0 52.588	1 2.418	1 12.247	21	0.057
22	0 3.604	0 13.434	0 23.263	0 33.093	0 42.922	0 52.752	1 2.582	1 12.411	22	0.060
23	0 3.768	0 13.598	0 23.427	0 33.257	0 43.086	0 52.916	1 2.745	1 12.575	23	0.063
24	0 3.932	0 13.761	0 23.591	0 33.420	0 43.250	0 53.080	1 2.909	1 12.739	24	0.066
25	0 4.096	0 13.925	0 23.755	0 33.584	0 43.414	0 53.243	1 3.073	1 12.903	25	0.068
26	0 4.259	0 14.089	0 23.919	0 33.748	0 43.578	0 53.407	1 3.237	1 13.066	26	0.071
27	0 4.423	0 14.253	0 24.082	0 33.912	0 43.742	0 53.571	1 3.401	1 13.230	27	0.074
28	0 4.587	0 14.417	0 24.246	0 34.076	0 43.905	0 53.735	1 3.564	1 13.394	28	0.076
29	0 4.751	0 14.581	0 24.410	0 34.240	0 44.069	0 53.899	1 3.728	1 13.558	29	0.079
30	0 4.915	0 14.744	0 24.574	0 34.403	0 44.233	0 54.063	1 3.892	1 13.722	30	0.082
31	0 5.079	0 14.908	0 24.738	0 34.567	0 44.397	0 54.226	1 4.056	1 13.886	31	0.085
32	0 5.242	0 15.072	0 24.902	0 34.731	0 44.561	0 54.390	1 4.220	1 14.049	32	0.087
33	0 5.406	0 15.236	0 25.065	0 34.895	0 44.724	0 54.554	1 4.384	1 14.213	33	0.090
34	0 5.570	0 15.400	0 25.229	0 35.059	0 44.888	0 54.718	1 4.547	1 14.377	34	0.093
35	0 5.734	0 15.563	0 25.393	0 35.223	0 45.052	0 54.882	1 4.711	1 14.541	35	0.096
36	0 5.898	0 15.727	0 25.557	0 35.386	0 45.216	0 55.046	1 4.875	1 14.705	36	0.098
37	0 6.062	0 15.891	0 25.721	0 35.550	0 45.380	0 55.209	1 5.039	1 14.868	37	0.101
38	0 6.225	0 16.055	0 25.885	0 35.714	0 45.544	0 55.373	1 5.203	1 15.032	38	0.104
39	0 6.389	0 16.219	0 26.048	0 35.878	0 45.707	0 55.537	1 5.367	1 15.196	39	0.106
40	0 6.553	0 16.383	0 26.212	0 36.042	0 45.871	0 55.701	1 5.530	1 15.360	40	0.109
41	0 6.717	0 16.546	0 26.376	0 36.206	0 46.035	0 55.865	1 5.694	1 15.524	41	0.112
42	0 6.881	0 16.710	0 26.540	0 36.369	0 46.199	0 56.028	1 5.858	1 15.688	42	0.115
43	0 7.045	0 16.874	0 26.704	0 36.533	0 46.363	0 56.192	1 6.022	1 15.851	43	0.117
44	0 7.208	0 17.038	0 26.867	0 36.697	0 46.527	0 56.356	1 6.186	1 16.015	44	0.120
45	0 7.372	0 17.202	0 27.031	0 36.861	0 46.690	0 56.520	1 6.350	1 16.179	45	0.123
46	0 7.536	0 17.366	0 27.195	0 37.025	0 46.854	0 56.684	1 6.513	1 16.343	46	0.126
47	0 7.700	0 17.529	0 27.359	0 37.188	0 47.018	0 56.848	1 6.677	1 16.507	47	0.128
48	0 7.864	0 17.693	0 27.523	0 37.352	0 47.182	0 57.011	1 6.841	1 16.671	48	0.131
49	0 8.027	0 17.857	0 27.687	0 37.516	0 47.346	0 57.175	1 7.005	1 16.834	49	0.134
50	0 8.191	0 18.021	0 27.850	0 37.680	0 47.510	0 57.339	1 7.169	1 16.998	50	0.137
51	0 8.355	0 18.185	0 28.014	0 37.844	0 47.673	0 57.503	1 7.332	1 17.162	51	0.139
52	0 8.519	0 18.349	0 28.178	0 38.008	0 47.837	0 57.667	1 7.496	1 17.326	52	0.142
53	0 8.683	0 18.512	0 28.342	0 38.171	0 48.001	0 57.831	1 7.660	1 17.490	53	0.145
54	0 8.847	0 18.676	0 28.506	0 38.335	0 48.165	0 57.994	1 7.824	1 17.654	54	0.147
55	0 9.010	0 18.840	0 28.670	0 38.499	0 48.329	0 58.158	1 7.988	1 17.817	55	0.150
56	0 9.174	0 19.004	0 28.833	0 38.663	0 48.492	0 58.322	1 8.152	1 17.981	56	0.153
57	0 9.338	0 19.168	0 28.997	0 38.827	0 48.656	0 58.486	1 8.315	1 18.145	57	0.156
58	0 9.502	0 19.331	0 29.161	0 38.991	0 48.820	0 58.650	1 8.479	1 18.309	58	0.158
59	0 9.666	0 19.495	0 29.325	0 39.154	0 48.984	0 58.814	1 8.643	1 18.473	59	0.161
Side-real.	0^{h}	1^{h}	2^{h}	3^{h}	4^{h}	5^{h}	6^{h}	7^{h}	For Seconds.	

TABLE II.—SIDEREAL INTO MEAN SOLAR TIME.

TO BE SUBTRACTED FROM A SIDEREAL TIME INTERVAL.

Sidereal.	8^{h}	9^{h}	10^{h}	11^{h}	12^{h}	13^{h}	14^{h}	15^{h}	For Seconds.	
m	m s	m s	m s	m s	m s	m s	m s	m s	s	s
0	1 18.636	1 28.466	1 38.296	1 48.125	1 57.955	2 7.784	2 17.614	2 27.443	0	0.000
1	1 18.800	1 28.630	1 38.459	1 48.289	1 58.119	2 7.948	2 17.778	2 27.607	1	0.003
2	1 18.964	1 28.794	1 38.623	1 48.453	1 58.282	2 8.112	2 17.941	2 27.771	2	0.005
3	1 19.128	1 28.958	1 38.787	1 48.617	1 58.446	2 8.276	2 18.105	2 27.935	3	0.008
4	1 19.292	1 29.121	1 38.951	1 48.780	1 58.610	2 8.440	2 18.269	2 28.099	4	0.011
5	1 19.456	1 29.285	1 39.115	1 48.944	1 58.774	2 8.603	2 18.433	2 28.263	5	0.014
6	1 19.619	1 29.449	1 39.279	1 49.108	1 58.938	2 8.767	2 18.597	2 28.426	6	0.016
7	1 19.783	1 29.613	1 39.442	1 49.272	1 59.101	2 8.931	2 18.761	2 28.590	7	0.019
8	1 19.947	1 29.777	1 39.606	1 49.436	1 59.265	2 9.095	2 18.924	2 28.754	8	0.022
9	1 20.111	1 29.940	1 39.770	1 49.600	1 59.429	2 9.259	2 19.088	2 28.918	9	0.025
10	1 20.275	1 30.104	1 39.934	1 49.763	1 59.593	2 9.423	2 19.252	2 29.082	10	0.027
11	1 20.439	1 30.268	1 40.098	1 49.927	1 59.757	2 9.586	2 19.416	2 29.245	11	0.030
12	1 20.602	1 30.432	1 40.261	1 50.091	1 59.921	2 9.750	2 19.580	2 29.409	12	0.033
13	1 20.766	1 30.596	1 40.425	1 50.255	2 0.084	2 9.914	2 19.744	2 29.573	13	0.035
14	1 20.930	1 30.760	1 40.589	1 50.419	2 0.248	2 10.078	2 19.907	2 29.737	14	0.038
15	1 21.094	1 30.923	1 40.753	1 50.583	2 0.412	2 10.242	2 20.071	2 29.901	15	0.041
16	1 21.258	1 31.087	1 40.917	1 50.746	2 0.576	2 10.405	2 20.235	2 30.065	16	0.044
17	1 21.422	1 31.251	1 41.081	1 50.910	2 0.740	2 10.569	2 20.399	2 30.228	17	0.046
18	1 21.585	1 31.415	1 41.244	1 51.074	2 0.904	2 10.733	2 20.563	2 30.392	18	0.049
19	1 21.749	1 31.579	1 41.408	1 51.238	2 1.067	2 10.897	2 20.727	2 30.556	19	0.052
20	1 21.913	1 31.743	1 41.572	1 51.402	2 1.231	2 11.061	2 20.890	2 30.720	20	0.055
21	1 22.077	1 31.906	1 41.736	1 51.565	2 1.395	2 11.225	2 21.054	2 30.884	21	0.057
22	1 22.241	1 32.070	1 41.900	1 51.729	2 1.559	2 11.388	2 21.218	2 31.048	22	0.060
23	1 22.404	1 32.234	1 42.064	1 51.893	2 1.723	2 11.552	2 21.382	2 31.211	23	0.063
24	1 22.568	1 32.398	1 42.227	1 52.057	2 1.887	2 11.716	2 21.546	2 31.375	24	0.066
25	1 22.732	1 32.562	1 42.391	1 52.221	2 2.050	2 11.880	2 21.709	2 31.539	25	0.068
26	1 22.896	1 32.726	1 42.555	1 52.385	2 2.214	2 12.044	2 21.873	2 31.703	26	0.071
27	1 23.060	1 32.889	1 42.719	1 52.548	2 2.378	2 12.208	2 22.037	2 31.867	27	0.074
28	1 23.224	1 33.053	1 42.883	1 52.712	2 2.542	2 12.371	2 22.201	2 32.031	28	0.076
29	1 23.387	1 33.217	1 43.047	1 52.876	2 2.706	2 12.535	2 22.365	2 32.194	29	0.079
30	1 23.551	1 33.381	1 43.210	1 53.040	2 2.869	2 12.699	2 22.529	2 32.358	30	0.082
31	1 23.715	1 33.545	1 43.374	1 53.204	2 3.033	2 12.863	2 22.692	2 32.522	31	0.085
32	1 23.879	1 33.708	1 43.538	1 53.368	2 3.197	2 13.027	2 22.856	2 32.686	32	0.087
33	1 24.043	1 33.872	1 43.702	1 53.531	2 3.361	2 13.191	2 23.020	2 32.850	33	0.090
34	1 24.207	1 34.036	1 43.866	1 53.695	2 3.525	2 13.354	2 23.184	2 33.013	34	0.093
35	1 24.370	1 34.200	1 44.029	1 53.859	2 3.689	2 13.518	2 23.348	2 33.177	35	0.096
36	1 24.534	1 34.364	1 44.193	1 54.023	2 3.852	2 13.682	2 23.512	2 33.341	36	0.098
37	1 24.698	1 34.528	1 44.357	1 54.187	2 4.016	2 13.846	2 23.675	2 33.505	37	0.101
38	1 24.862	1 34.691	1 44.521	1 54.351	2 4.180	2 14.010	2 23.839	2 33.669	38	0.104
39	1 25.026	1 34.855	1 44.685	1 54.514	2 4.344	2 14.173	2 24.003	2 33.833	39	0.106
40	1 25.190	1 35.019	1 44.849	1 54.678	2 4.508	2 14.337	2 24.167	2 33.996	40	0.109
41	1 25.353	1 35.183	1 45.012	1 54.842	2 4.672	2 14.501	2 24.331	2 34.160	41	0.112
42	1 25.517	1 35.347	1 45.176	1 55.006	2 4.835	2 14.665	2 24.495	2 34.324	42	0.115
43	1 25.681	1 35.511	1 45.340	1 55.170	2 4.999	2 14.829	2 24.658	2 34.488	43	0.117
44	1 25.845	1 35.674	1 45.504	1 55.333	2 5.163	2 14.993	2 24.822	2 34.652	44	0.120
45	1 26.009	1 35.838	1 45.668	1 55.497	2 5.327	2 15.156	2 24.986	2 34.816	45	0.123
46	1 26.172	1 36.002	1 45.832	1 55.661	2 5.491	2 15.320	2 25.150	2 34.979	46	0.126
47	1 26.336	1 36.166	1 45.995	1 55.825	2 5.655	2 15.484	2 25.314	2 35.143	47	0.128
48	1 26.500	1 36.330	1 46.159	1 55.989	2 5.818	2 15.648	2 25.477	2 35.307	48	0.131
49	1 26.664	1 36.493	1 46.323	1 56.153	2 5.982	2 15.812	2 25.641	2 35.471	49	0.134
50	1 26.828	1 36.657	1 46.487	1 56.316	2 6.146	2 15.976	2 25.805	2 35.635	50	0.137
51	1 26.992	1 36.821	1 46.651	1 56.480	2 6.310	2 16.139	2 25.969	2 35.798	51	0.139
52	1 27.155	1 36.985	1 46.815	1 56.644	2 6.474	2 16.303	2 26.133	2 35.962	52	0.142
53	1 27.319	1 37.149	1 46.978	1 56.808	2 6.637	2 16.467	2 26.297	2 36.126	53	0.145
54	1 27.483	1 37.313	1 47.142	1 56.972	2 6.801	2 16.631	2 26.460	2 36.290	54	0.147
55	1 27.647	1 37.476	1 47.306	1 57.136	2 6.965	2 16.795	2 26.624	2 36.454	55	0.150
56	1 27.811	1 37.640	1 47.470	1 57.299	2 7.129	2 16.959	2 26.788	2 36.618	56	0.153
57	1 27.975	1 37.804	1 47.634	1 57.463	2 7.293	2 17.122	2 26.952	2 36.781	57	0.156
58	1 28.138	1 37.968	1 47.797	1 57.627	2 7.457	2 17.286	2 27.116	2 36.945	58	0.158
59	1 28.302	1 38.132	1 47.961	1 57.791	2 7.620	2 17.450	2 27.280	2 37.109	59	0.161
Sidereal.	8^{h}	9^{h}	10^{h}	11^{h}	12^{h}	13^{h}	14^{h}	15^{h}	For Seconds.	

TABLE II.—SIDEREAL INTO MEAN SOLAR TIME.

TO BE SUBTRACTED FROM A SIDEREAL TIME INTERVAL.

Sidereal.	16^h	17^h	18^h	19^h	20^h	21^h	22^h	23^h	For Seconds.	
m	m s	m s	m s	m s	m s	m s	m s	m s	s	s
0	2 37.273	2 47.102	2 56.932	3 6.762	3 16.591	3 26.421	3 36.250	3 46.080	0	0.000
1	2 37.437	2 47.266	2 57.096	3 6.925	3 16.755	3 26.585	3 36.414	3 46.244	1	0.003
2	2 37.601	2 47.430	2 57.260	3 7.089	3 16.919	3 26.748	3 36.578	3 46.407	2	0.005
3	2 37.764	2 47.594	2 57.424	3 7.253	3 17.083	3 26.912	3 36.742	3 46.571	3	0.008
4	2 37.928	2 47.758	2 57.587	3 7.417	3 17.246	3 27.076	3 36.906	3 46.735	4	0.011
5	2 38.092	2 47.922	2 57.751	3 7.581	3 17.410	3 27.240	3 37.069	3 46.899	5	0.014
6	2 38.256	2 48.085	2 57.915	3 7.745	3 17.574	3 27.404	3 37.233	3 47.063	6	0.016
7	2 38.420	2 48.249	2 58.079	3 7.908	3 17.738	3 27.568	3 37.397	3 47.227	7	0.019
8	2 38.584	2 48.413	2 58.243	3 8.072	3 17.902	3 27.731	3 37.561	3 47.390	8	0.022
9	2 38.747	2 48.577	2 58.406	3 8.236	3 18.066	3 27.895	3 37.725	3 47.554	9	0.025
10	2 38.911	2 48.741	2 58.570	3 8.400	3 18.229	3 28.059	3 37.889	3 47.718	10	0.027
11	2 39.075	2 48.905	2 58.734	3 8.564	3 18.393	3 28.223	3 38.052	3 47.882	11	0.030
12	2 39.239	2 49.068	2 58.898	3 8.728	3 18.557	3 28.387	3 38.216	3 48.046	12	0.033
13	2 39.403	2 49.232	2 59.062	3 8.891	3 18.721	3 28.550	3 38.380	3 48.210	13	0.035
14	2 39.566	2 49.396	2 59.226	3 9.055	3 18.885	3 28.714	3 38.544	3 48.373	14	0.038
15	2 39.730	2 49.560	2 59.389	3 9.219	3 19.049	3 28.878	3 38.708	3 48.537	15	0.041
16	2 39.894	2 49.724	2 59.553	3 9.383	3 19.212	3 29.042	3 38.871	3 48.701	16	0.044
17	2 40.058	2 49.888	2 59.717	3 9.547	3 19.376	3 29.206	3 39.035	3 48.865	17	0.046
18	2 40.222	2 50.051	2 59.881	3 9.710	3 19.540	3 29.370	3 39.199	3 49.029	18	0.049
19	2 40.386	2 50.215	3 0.045	3 9.874	3 19.704	3 29.533	3 39.363	3 49.193	19	0.052
20	2 40.549	2 50.379	3 0.209	3 10.038	3 19.868	3 29.697	3 39.527	3 49.356	20	0.055
21	2 40.713	2 50.543	3 0.372	3 10.202	3 20.032	3 29.861	3 39.691	3 49.520	21	0.057
22	2 40.877	2 50.707	3 0.536	3 10.366	3 20.195	3 30.025	3 39.854	3 49.684	22	0.060
23	2 41.041	2 50.870	3 0.700	3 10.530	3 20.359	3 30.189	3 40.018	3 49.848	23	0.063
24	2 41.205	2 51.034	3 0.864	3 10.693	3 20.523	3 30.353	3 40.182	3 50.012	24	0.066
25	2 41.369	2 51.198	3 1.028	3 10.857	3 20.687	3 30.516	3 40.346	3 50.175	25	0.068
26	2 41.532	2 51.362	3 1.192	3 11.021	3 20.851	3 30.680	3 40.510	3 50.339	26	0.071
27	2 41.696	2 51.526	3 1.355	3 11.185	3 21.014	3 30.844	3 40.674	3 50.503	27	0.074
28	2 41.860	2 51.690	3 1.519	3 11.349	3 21.178	3 31.008	3 40.837	3 50.667	28	0.076
29	2 42.024	2 51.853	3 1.683	3 11.513	3 21.342	3 31.172	3 41.001	3 50.831	29	0.079
30	2 42.188	2 52.017	3 1.847	3 11.676	3 21.506	3 31.336	3 41.165	3 50.995	30	0.082
31	2 42.352	2 52.181	3 2.011	3 11.840	3 21.670	3 31.499	3 41.329	3 51.158	31	0.085
32	2 42.515	2 52.345	3 2.174	3 12.004	3 21.834	3 31.663	3 41.493	3 51.322	32	0.087
33	2 42.679	2 52.509	3 2.338	3 12.168	3 21.997	3 31.827	3 41.657	3 51.486	33	0.090
34	2 42.843	2 52.673	3 2.502	3 12.332	3 22.161	3 31.991	3 41.820	3 51.650	34	0.093
35	2 43.007	2 52.836	3 2.666	3 12.496	3 22.325	3 32.155	3 41.984	3 51.814	35	0.096
36	2 43.171	2 53.000	3 2.830	3 12.659	3 22.489	3 32.318	3 42.148	3 51.978	36	0.098
37	2 43.334	2 53.164	3 2.994	3 12.823	3 22.653	3 32.482	3 42.312	3 52.141	37	0.101
38	2 43.498	2 53.328	3 3.157	3 12.987	3 22.817	3 32.646	3 42.476	3 52.305	38	0.104
39	2 43.662	2 53.492	3 3.321	3 13.151	3 22.980	3 32.810	3 42.639	3 52.469	39	0.106
40	2 43.826	2 53.656	3 3.485	3 13.315	3 23.144	3 32.974	3 42.803	3 52.633	40	0.109
41	2 43.990	2 53.819	3 3.649	3 13.478	3 23.308	3 33.138	3 42.967	3 52.797	41	0.112
42	2 44.154	2 53.983	3 3.813	3 13.642	3 23.472	3 33.301	3 43.131	3 52.961	42	0.115
43	2 44.317	2 54.147	3 3.977	3 13.806	3 23.636	3 33.465	3 43.295	3 53.124	43	0.117
44	2 44.481	2 54.311	3 4.140	3 13.970	3 23.800	3 33.629	3 43.459	3 53.288	44	0.120
45	2 44.645	2 54.475	3 4.304	3 14.134	3 23.963	3 33.793	3 43.622	3 53.452	45	0.123
46	2 44.809	2 54.638	3 4.468	3 14.298	3 24.127	3 33.957	3 43.786	3 53.616	46	0.126
47	2 44.973	2 54.802	3 4.632	3 14.461	3 24.291	3 34.121	3 43.950	3 53.780	47	0.128
48	2 45.137	2 54.966	3 4.796	3 14.625	3 24.455	3 34.284	3 44.114	3 53.943	48	0.131
49	2 45.300	2 55.130	3 4.960	3 14.789	3 24.619	3 34.448	3 44.278	3 54.107	49	0.134
50	2 45.464	2 55.294	3 5.123	3 14.953	3 24.782	3 34.612	3 44.442	3 54.271	50	0.137
51	2 45.628	2 55.458	3 5.287	3 15.117	3 24.946	3 34.776	3 44.605	3 54.435	51	0.139
52	2 45.792	2 55.621	3 5.451	3 15.281	3 25.110	3 34.940	3 44.769	3 54.599	52	0.142
53	2 45.956	2 55.785	3 5.615	3 15.444	3 25.274	3 35.104	3 44.933	3 54.763	53	0.145
54	2 46.120	2 55.949	3 5.779	3 15.608	3 25.438	3 35.267	3 45.097	3 54.926	54	0.147
55	2 46.283	2 56.113	3 5.942	3 15.772	3 25.602	3 35.431	3 45.261	3 55.090	55	0.150
56	2 46.447	2 56.277	3 6.106	3 15.936	3 25.765	3 35.595	3 45.425	3 55.254	56	0.153
57	2 46.611	2 56.441	3 6.270	3 16.100	3 25.929	3 35.759	3 45.588	3 55.418	57	0.156
58	2 46.775	2 56.604	3 6.434	3 16.264	3 26.093	3 35.923	3 45.752	3 55.582	58	0.158
59	2 46.939	2 56.768	3 6.598	3 16.427	3 26.257	3 36.086	3 45.916	3 55.746	59	0.161
Sidereal.	16^h	17^h	18^h	19^h	20^h	21^h	22^h	23^h	For Seconds.	

TABLE III.—MEAN SOLAR INTO SIDEREAL TIME.

TO BE ADDED TO A MEAN TIME INTERVAL.

Mean Solar.	0^h	1^h	2^h	3^h	4^h	5^h	6^h	7^h	For Seconds.	
m	m s	m s	m s	m s	m s	m s	m s	m s	s	s
0	0 0.000	0 9.856	0 19.713	0 29.569	0 39.426	0 49.282	0 59.139	1 8.995	0	0.000
1	0 0.164	0 10.021	0 19.877	0 29.734	0 39.590	0 49.447	0 59.303	1 9.160	1	0.003
2	0 0.329	0 10.185	0 20.041	0 29.898	0 39.754	0 49.611	0 59.467	1 9.324	2	0.005
3	0 0.493	0 10.349	0 20.206	0 30.062	0 39.919	0 49.775	0 59.632	1 9.488	3	0.008
4	0 0.657	0 10.514	0 20.370	0 30.227	0 40.083	0 49.939	0 59.796	1 9.652	4	0.011
5	0 0.821	0 10.678	0 20.534	0 30.391	0 40.247	0 50.104	0 59.960	1 9.817	5	0.014
6	0 0.986	0 10.842	0 20.699	0 30.555	0 40.412	0 50.268	1 0.124	1 9.981	6	0.016
7	0 1.150	0 11.006	0 20.863	0 30.719	0 40.576	0 50.432	1 0.289	1 10.145	7	0.019
8	0 1.314	0 11.171	0 21.027	0 30.884	0 40.740	0 50.597	1 0.453	1 10.310	8	0.022
9	0 1.478	0 11.335	0 21.191	0 31.048	0 40.904	0 50.761	1 0.617	1 10.474	9	0.025
10	0 1.643	0 11.499	0 21.356	0 31.212	0 41.069	0 50.925	1 0.782	1 10.638	10	0.027
11	0 1.807	0 11.663	0 21.520	0 31.376	0 41.233	0 51.089	1 0.946	1 10.802	11	0.030
12	0 1.971	0 11.828	0 21.684	0 31.541	0 41.397	0 51.254	1 1.110	1 10.967	12	0.033
13	0 2.136	0 11.992	0 21.849	0 31.705	0 41.561	0 51.418	1 1.274	1 11.131	13	0.036
14	0 2.300	0 12.156	0 22.013	0 31.869	0 41.726	0 51.582	1 1.439	1 11.295	14	0.038
15	0 2.464	0 12.321	0 22.177	0 32.034	0 41.890	0 51.746	1 1.603	1 11.459	15	0.041
16	0 2.628	0 12.485	0 22.341	0 32.198	0 42.054	0 51.911	1 1.767	1 11.624	16	0.044
17	0 2.793	0 12.649	0 22.506	0 32.362	0 42.219	0 52.075	1 1.932	1 11.788	17	0.047
18	0 2.957	0 12.813	0 22.670	0 32.526	0 42.383	0 52.239	1 2.096	1 11.952	18	0.049
19	0 3.121	0 12.978	0 22.834	0 32.691	0 42.547	0 52.404	1 2.260	1 12.117	19	0.052
20	0 3.285	0 13.142	0 22.998	0 32.855	0 42.711	0 52.568	1 2.424	1 12.281	20	0.055
21	0 3.450	0 13.306	0 23.163	0 33.019	0 42.876	0 52.732	1 2.589	1 12.445	21	0.057
22	0 3.614	0 13.471	0 23.327	0 33.183	0 43.040	0 52.896	1 2.753	1 12.609	22	0.060
23	0 3.778	0 13.635	0 23.491	0 33.348	0 43.204	0 53.061	1 2.917	1 12.774	23	0.063
24	0 3.943	0 13.799	0 23.656	0 33.512	0 43.368	0 53.225	1 3.081	1 12.938	24	0.066
25	0 4.107	0 13.963	0 23.820	0 33.676	0 43.533	0 53.389	1 3.246	1 13.102	25	0.068
26	0 4.271	0 14.128	0 23.984	0 23.841	0 43.697	0 53.554	1 3.410	1 13.266	26	0.071
27	0 4.435	0 14.292	0 24.148	0 34.005	0 43.861	0 53.718	1 3.574	1 13.431	27	0.074
28	0 4.600	0 14.456	0 24.313	0 34.169	0 44.026	0 53.882	1 3.739	1 13.595	28	0.077
29	0 4.764	0 14.620	0 24.477	0 34.333	0 44.190	0 54.046	1 3.903	1 13.759	29	0.079
30	0 4.928	0 14.785	0 24.641	0 34.498	0 44.354	0 54.211	1 4.067	1 13.924	30	0.082
31	0 5.093	0 14.949	0 24.805	0 34.662	0 44.518	0 54.375	1 4.231	1 14.088	31	0.085
32	0 5.257	0 15.113	0 24.970	0 34.826	0 44.683	0 54.539	1 4.396	1 14.252	32	0.088
33	0 5.421	0 15.278	0 25.134	0 34.990	0 44.847	0 54.703	1 4.560	1 14.416	33	0.090
34	0 5.585	0 15.442	0 25.298	0 35.155	0 45.011	0 54.868	1 4.724	1 14.581	34	0.093
35	0 5.750	0 15.606	0 25.463	0 35.319	0 45.176	0 55.032	1 4.888	1 14.745	35	0.096
36	0 5.914	0 15.770	0 25.627	0 35.483	0 45.340	0 55.196	1 5.053	1 14.909	36	0.099
37	0 6.078	0 15.935	0 25.791	0 35.648	0 45.504	0 55.361	1 5.217	1 15.073	37	0.101
38	0 6.242	0 16.099	0 25.955	0 35.812	0 45.668	0 55.525	1 5.381	1 15.238	38	0.104
39	0 6.407	0 16.263	0 26.120	0 35.976	0 45.833	0 55.689	1 5.546	1 15.402	39	0.107
40	0 6.571	0 16.427	0 26.284	0 36.140	0 45.997	0 55.853	1 5.710	1 15.566	40	0.110
41	0 6.735	0 16.592	0 26.448	0 36.305	0 46.161	0 56.018	1 5.874	1 15.731	41	0.112
42	0 6.900	0 16.756	0 26.612	0 36.469	0 46.325	0 56.182	1 6.038	1 15.895	42	0.115
43	0 7.064	0 16.920	0 26.777	0 36.633	0 46.490	0 56.346	1 6.203	1 16.059	43	0.118
44	0 7.228	0 17.085	0 26.941	0 36.798	0 46.654	0 56.510	1 6.367	1 16.223	44	0.120
45	0 7.392	0 17.249	0 27.105	0 36.962	0 46.818	0 56.675	1 6.531	1 16.388	45	0.123
46	0 7.557	0 17.413	0 27.270	0 37.126	0 46.983	0 56.839	1 6.695	1 16.552	46	0.126
47	0 7.721	0 17.577	0 27.434	0 37.290	0 47.147	0 57.003	1 6.860	1 16.716	47	0.129
48	0 7.885	0 17.742	0 27.598	0 37.455	0 47.311	0 57.168	1 7.024	1 16.881	48	0.131
49	0 8.049	0 17.906	0 27.762	0 37.619	0 47.475	0 57.332	1 7.188	1 17.045	49	0.134
50	0 8.214	0 18.070	0 27.927	0 37.783	0 47.640	0 57.496	1 7.353	1 17.209	50	0.137
51	0 8.378	0 18.234	0 28.091	0 37.947	0 47.804	0 57.660	1 7.517	1 17.373	51	0.140
52	0 8.542	0 18.399	0 28.255	0 38.112	0 47.968	0 57.825	1 7.681	1 17.538	52	0.142
53	0 8.707	0 18.563	0 28.420	0 38.276	0 48.132	0 57.989	1 7.845	1 17.702	53	0.145
54	0 8.871	0 18.727	0 28.584	0 38.440	0 48.297	0 58.153	1 8.010	1 17.866	54	0.148
55	0 9.035	0 18.892	0 28.748	0 38.605	0 48.461	0 58.317	1 8.174	1 18.030	55	0.151
56	0 9.199	0 19.056	0 28.912	0 38.769	0 48.625	0 58.482	1 8.338	1 18.195	56	0.153
57	0 9.364	0 19.220	0 29.077	0 38.933	0 48.790	0 58.646	1 8.502	1 18.359	57	0.156
58	0 9.528	0 19.384	0 29.241	0 39.097	0 48.954	0 58.810	1 8.667	1 18.523	58	0.159
59	0 9.692	0 19.549	0 29.405	0 39.262	0 49.118	0 58.975	1 8.831	1 18.688	59	0.162
Mean Solar.	0^h	1^h	2^h	3^h	4^h	5^h	6^h	7^h	For Seconds.	

TO BE ADDED TO A MEAN TIME INTERVAL.

Mean Solar.	8^h	9^h	10^h	11^h	12^h	13^h	14^h	15^h	For Seconds.	
m	m s	m s	m s	m s	m s	m s	m s	m s	s	s
0	1 18.852	1 28.708	1 38.565	1 48.421	1 58.278	2 8.134	2 17.991	2 27.847	0	0.000
1	1 19.016	1 28.873	1 38.729	1 48.585	1 58.442	2 8.298	2 18.155	2 28.011	1	0.003
2	1 19.180	1 29.037	1 38.893	1 48.750	1 58.606	2 8.463	2 18.319	2 28.176	2	0.005
3	1 19.345	1 29.201	1 39.058	1 48.914	1 58.771	2 8.627	2 18.483	2 28.340	3	0.008
4	1 19.509	1 29.365	1 39.222	1 49.078	1 58.935	2 8.791	2 18.648	2 28.504	4	0.011
5	1 19.673	1 29.530	1 39.386	1 49.243	1 59.099	2 8.956	2 18.812	2 28.668	5	0.014
6	1 19.837	1 29.694	1 39.550	1 49.407	1 59.263	2 9.120	2 18.976	2 28.833	6	0.016
7	1 20.002	1 29.858	1 39.715	1 49.571	1 59.428	2 9.284	2 19.141	2 28.997	7	0.019
8	1 20.166	1 30.022	1 39.879	1 49.735	1 59.592	2 9.448	2 19.305	2 29.161	8	0.022
9	1 20.330	1 30.187	1 40.043	1 49.900	1 59.756	2 9.613	2 19.469	2 29.326	9	0.025
10	1 20.495	1 30.351	1 40.207	1 50.064	1 59.920	2 9.777	2 19.633	2 29.490	10	0.027
11	1 20.659	1 30.515	1 40.372	1 50.228	2 0.085	2 9.941	2 19.798	2 29.654	11	0.030
12	1 20.823	1 30.680	1 40.536	1 50.393	2 0.249	2 10.105	2 19.962	2 29.818	12	0.033
13	1 20.987	1 30.844	1 40.700	1 50.557	2 0.413	2 10.270	2 20.126	2 29.983	13	0.036
14	1 21.152	1 31.008	1 40.865	1 50.721	2 0.578	2 10.434	2 20.290	2 30.147	14	0.038
15	1 21.316	1 31.172	1 41.029	1 50.885	2 0.742	2 10.598	2 20.455	2 30.311	15	0.041
16	1 21.480	1 31.337	1 41.193	1 51.050	2 0.906	2 10.763	2 20.619	2 30.476	16	0.044
17	1 21.644	1 31.501	1 41.357	1 51.214	2 1.070	2 10.927	2 20.783	2 30.640	17	0.047
18	1 21.809	1 31.665	1 41.522	1 51.378	2 1.235	2 11.091	2 20.948	2 30.804	18	0.049
19	1 21.973	1 31.829	1 41.686	1 51.542	2 1.399	2 11.255	2 21.112	2 30.968	19	0.052
20	1 22.137	1 31.994	1 41.850	1 51.707	2 1.563	2 11.420	2 21.276	2 31.133	20	0.055
21	1 22.302	1 32.158	1 42.015	1 51.871	2 1.727	2 11.584	2 21.440	2 31.297	21	0.057
22	1 22.466	1 32.322	1 42.179	1 52.035	2 1.892	2 11.748	2 21.605	2 31.461	22	0.060
23	1 22.630	1 32.487	1 42.343	1 52.200	2 2.056	2 11.912	2 21.769	2 31.625	23	0.063
24	1 22.794	1 32.651	1 42.507	1 52.364	2 2.220	2 12.077	2 21.933	2 31.790	24	0.066
25	1 22.959	1 32.815	1 42.672	1 52.528	2 2.385	2 12.241	2 22.098	2 31.954	25	0.068
26	1 23.123	1 32.979	1 42.836	1 52.692	2 2.549	2 12.405	2 22.262	2 32.118	26	0.071
27	1 23.287	1 33.144	1 43.000	1 52.857	2 2.713	2 12.570	2 22.426	2 32.283	27	0.074
28	1 23.451	1 33.308	1 43.164	1 53.021	2 2.877	2 12.734	2 22.590	2 32.447	28	0.077
29	1 23.616	1 33.472	1 43.329	1 53.185	2 3.042	2 12.898	2 22.755	2 32.611	29	0.079
30	1 23.780	1 33.637	1 43.493	1 53.349	2 3.206	2 13.062	2 22.919	2 32.775	30	0.082
31	1 23.944	1 33.801	1 43.657	1 53.514	2 3.370	2 13.227	2 23.083	2 32.940	31	0.085
32	1 24.109	1 33.965	1 43.822	1 53.678	2 3.534	2 13.391	2 23.247	2 33.104	32	0.088
33	1 24.273	1 34.129	1 43.986	1 53.842	2 3.699	2 13.555	2 23.412	2 33.268	33	0.090
34	1 24.437	1 34.294	1 44.150	1 54.007	2 3.863	2 13.720	2 23.576	2 33.432	34	0.093
35	1 24.601	1 34.458	1 44.314	1 54.171	2 4.027	2 13.884	2 23.740	2 33.597	35	0.096
36	1 24.766	1 34.622	1 44.479	1 54.335	2 4.192	2 14.048	2 23.905	2 33.761	36	0.099
37	1 24.930	1 34.786	1 44.643	1 54.499	2 4.356	2 14.212	2 24.069	2 33.925	37	0.101
38	1 25.094	1 34.951	1 44.807	1 54.664	2 4.520	2 14.377	2 24.233	2 34.090	38	0.104
39	1 25.259	1 35.115	1 44.971	1 54.828	2 4.684	2 14.541	2 24.397	2 34.254	39	0.107
40	1 25.423	1 35.279	1 45.136	1 54.992	2 4.849	2 14.705	2 24.562	2 34.418	40	0.110
41	1 25.587	1 35.444	1 45.300	1 55.156	2 5.013	2 14.869	2 24.726	2 34.582	41	0.112
42	1 25.751	1 35.608	1 45.464	1 55.321	2 5.177	2 15.034	2 24.890	2 34.747	42	0.115
43	1 25.916	1 35.772	1 45.629	1 55.485	2 5.342	2 15.198	2 25.054	2 34.911	43	0.118
44	1 26.080	1 35.936	1 45.793	1 55.649	2 5.506	2 15.362	2 25.219	2 35.075	44	0.120
45	1 26.244	1 36.101	1 45.957	1 55.814	2 5.670	2 15.527	2 25.383	2 35.239	45	0.123
46	1 26.408	1 36.265	1 46.121	1 55.978	2 5.834	2 15.691	2 25.547	2 35.404	46	0.126
47	1 26.573	1 36.429	1 46.286	1 56.142	2 5.999	2 15.855	2 25.712	2 35.568	47	0.129
48	1 26.737	1 36.593	1 46.450	1 56.306	2 6.163	2 16.019	2 25.876	2 35.732	48	0.131
49	1 26.901	1 36.758	1 46.614	1 56.471	2 6.327	2 16.184	2 26.040	2 35.897	49	0.134
50	1 27.066	1 36.922	1 46.778	1 56.635	2 6.491	2 16.348	2 26.204	2 36.061	50	0.137
51	1 27.230	1 37.086	1 46.943	1 56.799	2 6.656	2 16.512	2 26.369	2 36.225	51	0.140
52	1 27.394	1 37.251	1 47.107	1 56.964	2 6.820	2 16.676	2 26.533	2 36.389	52	0.142
53	1 27.558	1 37.415	1 47.271	1 57.128	2 6.984	2 16.841	2 26.697	2 36.554	53	0.145
54	1 27.723	1 37.579	1 47.436	1 57.292	2 7.149	2 17.005	2 26.861	2 36.718	54	0.148
55	1 27.887	1 37.743	1 47.600	1 57.456	2 7.313	2 17.169	2 27.026	2 36.882	55	0.151
56	1 28.051	1 37.908	1 47.764	1 57.621	2 7.477	2 17.334	2 27.190	2 37.047	56	0.153
57	1 28.215	1 38.072	1 47.928	1 57.785	2 7.641	2 17.498	2 27.354	2 37.211	57	0.156
58	1 28.380	1 38.236	1 48.093	1 57.949	2 7.806	2 17.662	2 27.519	2 37.375	58	0.159
59	1 28.544	1 38.400	1 48.257	1 58.113	2 7.970	2 17.826	2 27.683	2 37.539	59	0.162
Mean Solar.	8^h	9^h	10^h	11^h	12^h	13^h	14^h	15^h	For Seconds.	

TABLE III.—MEAN SOLAR INTO SIDEREAL TIME.

TO BE ADDED TO A MEAN TIME INTERVAL.

Mean Solar.	16^h	17^h	18^h	19^h	20^h	21^h	22^h	23^h	For Seconds.	
m	m s	m s	m s	m s	m s	m s	m s	m s	s	s
0	2 37.704	2 47.560	2 57.417	3 7.273	3 17.129	3 26.986	3 36.842	3 46.699	0	0.000
1	2 37.868	2 47.724	2 57.581	3 7.437	3 17.294	3 27.150	3 37.007	3 46.863	1	0.003
2	2 38.032	2 47.889	2 57.745	3 7.602	3 17.458	3 27.315	3 37.171	3 47.027	2	0.005
3	2 38.196	2 48.053	2 57.909	3 7.766	3 17.622	3 27.479	3 37.335	3 47.192	3	0.008
4	2 38.361	2 48.217	2 58.074	3 7.930	3 17.787	3 27.643	3 37.500	3 47.356	4	0.011
5	2 38.525	2 48.381	2 58.238	3 8.094	3 17.951	3 27.807	3 37.664	3 47.520	5	0.014
6	2 38.689	2 48.546	2 58.402	3 8.259	3 18.115	3 27.972	3 37.828	3 47.685	6	0.016
7	2 38.854	2 48.710	2 58.566	3 8.423	3 18.279	3 28.136	3 37.992	3 47.849	7	0.019
8	2 39.018	2 48.874	2 58.731	3 8.587	3 18.444	3 28.300	3 38.157	3 48.013	8	0.022
9	2 39.182	2 49.039	2 58.895	3 8.751	3 18.608	3 28.464	3 38.321	3 48.177	9	0.025
10	2 39.346	2 49.203	2 59.059	3 8.916	3 18.772	3 28.629	3 38.485	3 48.342	10	0.027
11	2 39.511	2 49.367	2 59.224	3 9.080	3 18.937	3 28.793	3 38.649	3 48.506	11	0.030
12	2 39.675	2 49.531	2 59.388	3 9.244	3 19.101	3 28.957	3 38.814	3 48.670	12	0.033
13	2 39.839	2 49.696	2 59.552	3 9.409	3 19.265	3 29.122	3 38.978	3 48.834	13	0.036
14	2 40.003	2 49.860	2 59.716	3 9.573	3 19.429	3 29.286	3 39.142	3 48.999	14	0.038
15	2 40.168	2 50.024	2 59.881	3 9.737	3 19.594	3 29.450	3 39.307	3 49.163	15	0.041
16	2 40.332	2 50.188	3 0.045	3 9.901	3 19.758	3 29.614	3 39.471	3 49.327	16	0.044
17	2 40.496	2 50.353	3 0.209	3 10.066	3 19.922	3 29.779	3 39.635	3 49.492	17	0.047
18	2 40.661	2 50.517	3 0.373	3 10.230	3 20.086	3 29.943	3 39.799	3 49.656	18	0.049
19	2 40.825	2 50.681	3 0.538	3 10.394	3 20.251	3 30.107	3 39.964	3 49.820	19	0.052
20	2 40.989	2 50.846	3 0.702	3 10.559	3 20.415	3 30.271	3 40.128	3 49.984	20	0.055
21	2 41.153	2 51.010	3 0.866	3 10.723	3 20.579	3 30.436	3 40.292	3 50.149	21	0.057
22	2 41.318	2 51.174	3 1.031	3 10.887	3 20.744	3 30.600	3 40.456	3 50.313	22	0.060
23	2 41.482	2 51.338	3 1.195	3 11.051	3 20.908	3 30.764	3 40.621	3 50.477	23	0.063
24	2 41.646	2 51.503	3 1.359	3 11.216	3 21.072	3 30.929	3 40.785	3 50.642	24	0.066
25	2 41.810	2 51.667	3 1.523	3 11.380	3 21.236	3 31.093	3 40.949	3 50.806	25	0.068
26	2 41.975	2 51.831	3 1.688	3 11.544	3 21.401	3 31.257	3 41.114	3 50.970	26	0.071
27	2 42.139	2 51.995	3 1.852	3 11.708	3 21.565	3 31.421	3 41.278	3 51.134	27	0.074
28	2 42.303	2 52.160	3 2.016	3 11.873	3 21.729	3 31.586	3 41.442	3 51.299	28	0.077
29	2 42.468	2 52.324	3 2.181	3 12.037	3 21.893	3 31.750	3 41.606	3 51.463	29	0.079
30	2 42.632	2 52.488	3 2.345	3 12.201	3 22.058	3 31.914	3 41.771	3 51.627	30	0.082
31	2 42.796	2 52.653	3 2.509	3 12.366	3 22.222	3 32.078	3 41.935	3 51.791	31	0.085
32	2 42.960	2 52.817	3 2.673	3 12.530	3 22.386	3 32.243	3 42.099	3 51.956	32	0.088
33	2 43.125	2 52.981	3 2.838	3 12.694	3 22.551	3 32.407	3 42.264	3 52.120	33	0.090
34	2 43.289	2 53.145	3 3.002	3 12.858	3 22.715	3 32.571	3 42.428	3 52.284	34	0.093
35	2 43.453	2 53.310	3 3.166	3 13.023	3 22.879	3 32.736	3 42.592	3 52.449	35	0.096
36	2 43.617	2 53.474	3 3.330	3 13.187	3 23.043	3 32.900	3 42.756	3 52.613	36	0.099
37	2 43.782	2 53.638	3 3.495	3 13.351	3 23.208	3 33.064	3 42.921	3 52.777	37	0.101
38	2 43.946	2 53.803	3 3.659	3 13.515	3 23.372	3 33.228	3 43.085	3 52.941	38	0.104
39	2 44.110	2 53.967	3 3.823	3 13.680	3 23.536	3 33.393	3 43.249	3 53.106	39	0.107
40	2 44.275	2 54.131	3 3.988	3 13.844	3 23.700	3 33.557	3 43.413	3 53.270	40	0.110
41	2 44.439	2 54.295	3 4.152	3 14.008	3 23.865	3 33.721	3 43.578	3 53.434	41	0.112
42	2 44.603	2 54.460	3 4.316	3 14.173	3 24.029	3 33.886	3 43.742	3 53.598	42	0.115
43	2 44.767	2 54.624	3 4.480	3 14.337	3 24.193	3 34.050	3 43.906	3 53.763	43	0.118
44	2 44.932	2 54.788	3 4.645	3 14.501	3 24.358	3 34.214	3 44.071	3 53.927	44	0.120
45	2 45.096	2 54.952	3 4.809	3 14.665	3 24.522	3 34.378	3 44.235	3 54.091	45	0.123
46	2 45.260	2 55.117	3 4.973	3 14.830	3 24.686	3 34.543	3 44.399	3 54.256	46	0.126
47	2 45.425	2 55.281	3 5.137	3 14.994	3 24.850	3 34.707	3 44.563	3 54.420	47	0.129
48	2 45.589	2 55.445	3 5.302	3 15.158	3 25.015	3 34.871	3 44.728	3 54.584	48	0.131
49	2 45.753	2 55.610	3 5.466	3 15.322	3 25.179	3 35.035	3 44.892	3 54.748	49	0.134
50	2 45.917	2 55.774	3 5.630	3 15.487	3 25.343	3 35.200	3 45.056	3 54.913	50	0.137
51	2 46.082	2 55.938	3 5.795	3 15.651	3 25.508	3 35.364	3 45.220	3 55.077	51	0.140
52	2 46.246	2 56.102	3 5.959	3 15.815	3 25.672	3 35.528	3 45.385	3 55.241	52	0.142
53	2 46.410	2 56.267	3 6.123	3 15.980	3 25.836	3 35.693	3 45.549	3 55.405	53	0.145
54	2 46.574	2 56.431	3 6.287	3 16.144	3 26.000	3 35.857	3 45.713	3 55.570	54	0.148
55	2 46.739	2 56.595	3 6.452	3 16.308	3 26.165	3 36.021	3 45.878	3 55.734	55	0.151
56	2 46.903	2 56.759	3 6.616	3 16.472	3 26.329	3 36.185	3 46.042	3 55.898	56	0.153
57	2 47.067	2 56.924	3 6.780	3 16.637	3 26.493	3 36.350	3 46.206	3 56.063	57	0.156
58	2 47.232	2 57.088	3 6.944	3 16.801	3 26.657	3 36.514	3 46.370	3 56.227	58	0.159
59	2 47.396	2 57.252	3 7.109	3 16.965	3 26.822	3 36.678	3 46.535	3 56.391	59	0.162
Mean Solar.	16^h	17^h	18^h	19^h	20^h	21^h	22^h	23^h	For Seconds.	

TABLE IV.

FOR FINDING THE LATITUDE BY AN OBSERVED ALTITUDE OF POLARIS, 1912.

Reduce the observed altitude of Polaris to the true altitude.

Reduce the recorded time of observation to the local sidereal time.

Take out the App. R. A. and App. Decl. of Polaris for the time of observation (Table I).

Subtract the App. R. A. from the local sidereal time of observation and the remainder is the hour-angle of Polaris.

With this hour-angle as the vertical argument, and the App. Decl. of Polaris as the horizontal argument, take out the correction from Table IV and add it to or subtract it from the true altitude, according to its sign.

For other altitudes than 45°, corrections taken from the supplementary table at the bottom of Table IV (Table IVa) may be applied when necessary for the degree of accuracy required.

Example.—1912, October 7, at $10^h\ 40^m\ 30^s$ P. M. local mean solar time, in longitude 59° west of Greenwich, suppose the true altitude of Polaris to be 33° 20′ 0″, required the latitude of the place.

	h	m	s
Local astronomical mean time	10	40	30
Reductions from Table III for $10^h\ 40^m\ 30^s$		+1	45
Greenwich sidereal time of mean noon, October 7, Table I .	13	3	3
Reduction from Table III, for longitude (=$3^h\ 56^m$ west, or plus)		+0	39
	h	m	s
Sum (having regard to signs) is equal to local sidereal time .	23	45	57
R. A. of Polaris (Table I) for time of observation . . .	1	28	43
	h	m	s
Remainder is equal to hour-angle of Polaris . . .	22	17	14

	°	′	″
Decl. of Polaris (Table I) for time of observation	88	50	25

	°	′	″
True altitude	+33	20	0
Correction from Table IV	− 1	2	34
Correction from Table IVa			− 3
Latitude of the place	+32	17	23

Observations of Polaris for latitude should be made, when practicable, near the times of upper or of lower culminations (hour angle 0^h or 12^h) (Table I, 4th and 5th columns). However, at sea, if made near elongation (hour angle 6^h or 18^h), the hour angle, and hence the local time, should be known within one minute.

H. A. \ Decl.	88° 50′ 0″		88° 50′ 10″		88° 50′ 20″		88° 50′ 30″		88° 50′ 40″		88° 50′ 50″		Decl. / H. A.
h m	′ ″		′ ″		′ ″		′ ″		′ ″		′ ″		h m
0 0	−70 0		−69 50		−69 40		−69 30		−69 20		−69 10		24 0
3	69 59	1	69 49	1	69 39	1	69 29	1	69 19	1	69 9	1	23 57
6	69 58	1	69 48	1	69 38	1	69 28	1	69 18	1	69 8	1	54
9	69 56	2	69 46	2	69 36	2	69 26	2	69 16	2	69 6	2	51
12	69 54	2	69 44	2	69 34	2	69 24	2	69 14	2	69 4	2	48
0 15	−69 51	3	−69 41	3	−69 31	3	−69 21	3	−69 11	3	−69 1	3	23 45
18	69 47	4	69 37	4	69 27	4	69 17	4	69 7	4	68 57	4	42
21	69 42	5	69 32	5	69 22	5	69 12	5	69 2	5	68 52	5	39
24	69 36	6	69 26	6	69 16	6	69 6	6	68 56	6	68 46	6	36
27	69 30	6	69 20	6	69 10	6	69 0	6	68 50	6	68 40	6	33
0 30	−69 23	7	−69 13	7	−69 3	7	−68 53	7	−68 43	7	−68 33	7	23 30
33	69 16	7	69 6	7	68 56	7	68 46	7	68 36	7	68 26	7	27
36	69 8	8	68 58	8	68 48	8	68 38	8	68 28	8	68 18	8	24
39	68 59	9	68 49	9	68 39	9	68 29	9	68 19	9	68 9	9	21
42	68 49	10	68 39	10	68 29	10	68 19	10	68 9	10	67 59	10	18
0 45	−68 38	11	−68 28	11	−68 18	11	−68 8	11	−67 58	11	−67 48	11	23 15
48	68 27	11	68 17	11	68 7	11	67 57	11	67 47	11	67 37	11	12
51	68 15	12	68 5	12	67 55	12	67 45	12	67 35	12	67 25	12	9
54	68 2	13	67 52	13	67 42	13	67 32	13	67 22	13	67 12	13	6
0 57	67 49	13	67 39	13	67 29	13	67 19	13	67 9	13	66 59	13	3
1 0	−67 35	14	−67 25	14	−67 15	14	−67 5	14	−66 55	14	−66 45	14	23 0
3	67 20	15	67 11	14	67 1	14	66 51	14	66 41	14	66 31	14	22 57
6	67 5	15	66 56	15	66 46	15	66 36	15	66 26	15	66 16	15	54
9	66 48	17	66 39	17	66 29	17	66 19	17	66 9	17	65 59	17	51
1 12	−66 31	17	−66 22	17	−66 12	17	−66 2	17	−65 52	17	−65 42	17	22 48

TABLE IV.

FOR FINDING THE LATITUDE BY AN OBSERVED ALTITUDE OF POLARIS, 1912.

H. A. / Decl.	88° 50′ 0″		88° 50′ 10″		88° 50′ 20″		88° 50′ 30″		88° 50′ 40″		88° 50′ 50″		Decl. / H. A.
h m	′ ″		′ ″		′ ″		′ ″		′ ″		′ ″		h m
1 12	−66 31	18	−66 22	18	−66 12	18	−66 2	18	−65 52	18	−65 42	17	22 48
15	66 13	18	66 4	18	65 54	18	65 44	18	65 34	18	65 25	18	45
18	65 55	19	65 46	19	65 36	19	65 26	19	65 16	19	65 7	19	42
21	65 36	20	65 27	20	65 17	20	65 7	19	64 57	19	64 48	19	39
24	65 16	20	65 7	20	64 57	20	64 48	20	64 38	20	64 29	20	36
1 27	−64 56	21	−64 47	21	−64 37	21	−64 28	21	−64 18	21	−64 9	21	22 33
30	64 35	22	64 26	22	64 16	22	64 7	22	63 57	22	63 48	22	30
33	64 13	22	64 4	22	63 54	22	63 45	22	63 35	22	63 26	22	27
36	63 51	23	63 42	23	63 32	23	63 23	23	63 13	23	63 4	23	24
39	63 28	24	63 19	24	63 9	24	63 0	24	62 50	23	62 41	23	21
1 42	−63 4	25	−62 55	24	−62 45	24	−62 36	24	−62 27	24	−62 18	24	22 18
45	62 39	25	62 31	25	62 21	25	62 12	25	62 3	25	61 54	25	15
48	62 14	26	62 6	26	61 56	26	61 47	26	61 38	26	61 29	25	12
51	61 48	27	61 40	27	61 30	26	61 21	26	61 12	26	61 4	26	9
54	61 21	27	61 13	27	61 4	27	60 55	27	60 46	27	60 38	27	6
1 57	−60 54	28	−60 46	28	−60 37	28	−60 28	28	−60 19	27	−60 11	27	22 3
2 0	60 26	28	60 18	28	60 9	28	60 0	28	59 52	28	59 44	28	22 0
3	59 58	29	59 50	29	59 41	29	59 32	29	59 24	29	59 16	29	21 57
6	59 29	29	59 21	29	59 12	29	59 3	29	58 55	29	58 47	29	54
9	59 0	30	58 52	30	58 43	30	58 34	30	58 26	30	58 18	30	51
2 12	−58 30	31	−58 22	31	−58 13	31	−58 4	30	−57 56	30	−57 48	30	21 48
15	57 59	31	57 51	31	57 42	31	57 34	31	57 26	31	57 18	31	45
18	57 28	32	57 20	32	57 11	32	57 3	32	56 55	32	56 47	32	42
21	56 56	33	56 48	33	56 39	32	56 31	32	56 23	32	56 15	32	39
24	56 23	33	56 15	33	56 7	33	55 59	33	55 51	33	55 43	33	36
2 27	−55 50	34	−55 42	33	−55 34	34	−55 26	34	−55 18	34	−55 10	33	21 33
30	55 16	34	55 9	34	55 0	34	54 52	34	54 44	34	54 37	34	30
33	54 42	35	54 35	35	54 26	35	54 18	35	54 10	35	54 3	35	27
36	54 7	35	54 0	35	53 51	35	53 43	35	53 35	35	53 28	35	24
39	53 32	36	53 25	36	53 16	36	53 8	36	53 0	36	52 53	36	21
2 42	−52 56	37	−52 49	37	−52 40	36	−52 32	36	−52 24	36	−52 17	36	21 18
45	52 19	37	52 12	37	52 4	37	51 56	37	51 48	36	51 41	36	15
48	51 42	37	51 35	37	51 27	37	51 19	37	51 12	37	51 5	37	12
51	51 5	38	50 58	38	50 50	38	50 42	38	50 35	38	50 28	38	9
54	50 27	39	50 20	39	50 12	38	50 4	38	49 57	38	49 50	38	6
2 57	−49 48	39	−49 41	39	−49 34	39	−49 26	39	−49 19	38	−49 12	38	21 3
3 0	49 9	39	49 2	39	48 55	40	48 47	39	48 41	39	48 34	39	21 0
3	48 30	41	48 23	40	48 15	40	48 8	40	48 2	40	47 55	40	20 57
6	47 49	41	47 43	41	47 35	41	47 28	41	47 22	41	47 15	40	54
9	47 8	41	47 2	41	46 54	41	46 47	41	46 41	41	46 35	41	51
3 12	−46 27	41	−46 21	41	−46 13	41	−46 6	41	−46 0	41	−45 54	42	20 48
15	45 46	42	45 40	42	45 32	42	45 25	42	45 19	42	45 12	42	45
18	45 4	43	44 58	43	44 50	42	44 43	42	44 37	42	44 30	42	42
21	44 21	43	44 15	43	44 8	43	44 1	43	43 55	43	43 48	42	39
24	43 38	43	43 32	43	43 25	43	43 18	43	43 12	43	43 6	43	36
3 27	−42 55	43	−42 49	43	−42 42	44	−42 35	43	−42 29	43	−42 23	43	20 33
30	42 12	45	42 6	45	41 58	44	41 52	44	41 46	44	41 40	44	30
33	41 27	45	41 21	45	41 14	45	41 8	45	41 2	44	40 56	44	27
36	40 42	45	40 36	45	40 29	45	40 23	45	40 18	45	40 12	45	24
39	39 57	46	39 51	46	39 44	46	39 38	45	39 33	45	39 27	45	21
3 42	−39 11	46	−39 5	46	−38 58	46	−38 53	46	−38 48	46	−38 42	45	20 18
45	38 25	47	38 19	46	38 12	46	38 7	46	38 2	46	37 57	46	15
48	37 38	47	37 33	47	37 26	46	37 21	46	37 16	46	37 11	46	12
51	36 51	47	36 46	47	36 40	47	36 35	47	36 30	47	36 25	47	9
54	36 4	47	35 59	47	35 53	47	35 48	47	35 43	47	35 38	47	6
3 57	−35 17	48	−35 12	48	−35 6	48	−35 1	48	−34 56	47	−34 51	47	20 3
4 0	34 29	49	34 24	48	34 18	48	34 13	48	34 9	48	34 4	48	20 0
3	33 40	49	33 36	49	33 30	48	33 25	48	33 21	48	33 16	48	19 57
6	32 51	48	32 47	48	32 42	49	32 37	49	32 33	49	32 28	48	54
4 9	−32 3		−31 59		−31 53		−31 48		−31 44		−31 40		19 51

TABLE IV.

FOR FINDING THE LATITUDE BY AN OBSERVED ALTITUDE OF POLARIS, 1912.

Decl. H. A.	88° 50′ 0″		88° 50′ 10″		88° 50′ 20″		88° 50′ 30″		88° 50′ 40″		88° 50′ 50″		Decl. H. A.
h m	′ ″		′ ″		′ ″		′ ″		′ ″		′ ″		h m
4 9	−32 3		−31 59		−31 53		−31 48		−31 44		−31 40		19 51
12	31 14	49	31 10	49	31 4	49	30 59	49	30 55	49	30 51	49	48
15	30 24	50	30 20	50	30 15	49	30 10	49	30 6	49	30 2	49	45
18	29 34	50	29 30	50	29 25	50	29 20	50	29 16	50	29 13	49	42
21	28 44	50	28 40	50	28 35	50	28 30	50	28 26	50	28 23	50	39
4 24	−27 53	51	−27 50	50	−27 45	50	−27 40	50	−27 36	50	−27 33	50	19 36
27	27 2	51	26 59	51	26 55	50	26 50	50	26 46	50	26 42	51	33
30	26 11	51	26 8	51	26 4	51	26 0	50	25 56	50	25 52	50	30
33	25 20	51	25 17	51	25 13	51	25 9	51	25 5	51	25 1	51	27
36	24 29	51	24 25	52	24 22	51	24 18	51	24 14	51	24 10	51	24
4 39	−23 37	52	−23 33	52	−23 30	52	−23 26	52	−23 23	51	−23 19	51	19 21
42	22 45	52	22 41	52	22 38	52	22 34	52	22 31	52	22 27	52	18
45	21 52	53	21 49	52	21 46	52	21 42	52	21 39	52	21 36	51	15
48	20 59	53	20 57	52	20 54	52	20 50	52	20 47	52	20 44	52	12
51	20 6	53	20 4	53	20 1	53	19 58	52	19 55	52	19 52	52	9
4 54	−19 13	53	−19 11	53	−19 8	53	−19 6	52	−19 3	52	−19 0	52	19 6
4 57	18 20	53	18 18	53	18 15	53	18 13	53	18 11	52	18 8	52	3
5 0	17 26	54	17 24	54	17 22	53	17 20	53	17 18	53	17 15	53	19 0
3	16 33	53	16 31	53	16 29	53	16 27	53	16 25	53	16 22	53	18 57
6	15 40	53	15 38	53	15 36	53	15 34	53	15 32	53	15 29	53	54
5 9	−14 46	54	−14 44	54	−14 42	54	−14 41	53	−14 39	53	−14 36	53	18 51
12	13 52	54	13 50	54	13 48	54	13 47	54	13 46	53	13 43	53	48
15	12 58	54	12 56	54	12 54	54	12 53	54	12 52	54	12 50	53	45
18	12 4	54	12 2	54	12 0	54	11 59	54	11 58	54	11 56	54	42
21	11 9	55	11 8	54	11 6	54	11 5	54	11 4	54	11 2	54	39
5 24	−10 14	55	−10 13	55	−10 12	54	−10 11	54	−10 10	54	−10 8	54	18 36
27	9 20	54	9 19	54	9 18	54	9 17	54	9 16	54	9 14	54	33
30	8 26	54	8 25	54	8 24	54	8 23	54	8 22	54	8 21	53	30
33	7 31	55	7 30	55	7 30	54	7 29	54	7 28	54	7 27	54	27
36	6 36	55	6 35	55	6 35	55	6 35	54	6 34	54	6 33	54	24
5 39	− 5 42	54	− 5 41	54	− 5 41	54	− 5 41	54	− 5 40	54	− 5 39	54	18 21
42	4 48	54	4 47	54	4 46	55	4 46	55	4 45	55	4 44	55	18
45	3 53	55	3 52	55	3 51	55	3 51	55	3 50	55	3 49	55	15
48	2 57	56	2 56	56	2 56	55	2 56	55	2 56	54	2 55	54	12
51	2 1	56	2 1	55	2 1	55	2 1	55	2 1	55	2 1	54	9
5 54	− 1 6	55	− 1 6	55	− 1 6	55	− 1 6	55	− 1 6	55	− 1 6	55	18 6
5 57	− 0 12	54	− 0 12	54	− 0 12	54	− 0 12	54	− 0 12	54	− 0 12	54	3
6 0	+ 0 43	55	+ 0 43	55	+ 0 42	54	+ 0 42	54	+ 0 42	54	+ 0 42	54	18 0
3	1 38	55	1 37	54	1 37	55	1 37	55	1 36	54	1 36	54	17 57
6	2 33	55	2 32	55	2 31	54	2 31	54	2 30	54	2 30	54	54
6 9	+ 3 28	55	+ 3 27	55	+ 3 26	55	+ 3 26	55	+ 3 25	55	+ 3 24	54	17 51
12	4 23	55	4 22	55	4 20	54	4 20	54	4 19	54	4 18	54	48
15	5 18	55	5 17	55	5 15	55	5 15	55	5 14	55	5 13	55	45
18	6 12	54	6 11	54	6 10	55	6 9	54	6 8	54	6 7	54	42
21	7 6	54	7 5	54	7 4	54	7 4	55	7 2	54	7 1	54	39
6 24	+ 8 1	55	+ 8 0	55	+ 7 59	55	+ 7 58	54	+ 7 56	54	+ 7 55	54	17 36
27	8 56	55	8 55	55	8 54	55	8 52	54	8 50	54	8 49	54	33
30	9 50	54	9 49	54	9 48	54	9 46	54	9 44	54	9 43	54	30
33	10 44	54	10 43	54	10 42	54	10 40	54	10 38	54	10 37	54	27
36	11 39	55	11 37	54	11 36	54	11 34	54	11 32	54	11 30	53	24
6 39	+12 33	54	+12 31	54	+12 30	54	+12 28	54	+12 26	54	+12 24	54	17 21
42	13 27	54	13 25	54	13 24	54	13 22	54	13 20	54	13 18	54	18
45	14 21	54	14 19	54	14 17	53	14 15	53	14 13	53	14 11	53	15
48	15 14	53	15 12	53	15 10	53	15 8	53	15 6	53	15 4	53	12
51	16 8	54	16 6	54	16 3	53	16 1	53	15 59	53	15 57	53	9
6 54	+17 1	53	+16 59	53	+16 56	53	+16 54	53	+16 52	53	+16 49	52	17 6
6 57	17 54	53	17 52	53	17 49	53	17 46	52	17 44	52	17 41	52	3
7 0	18 47	53	18 45	53	18 42	53	18 38	52	18 36	52	18 33	52	17 0
3	19 40	53	19 37	52	19 34	52	19 30	52	19 28	52	19 25	52	16 57
7 6	+20 33	53	+20 30	53	+20 26	52	+20 22	52	+20 20	52	+20 17	52	16 54

TABLE IV.

FOR FINDING THE LATITUDE BY AN OBSERVED ALTITUDE OF POLARIS, 1912.

Decl. H. A.	88° 50′ 0″		88° 50′ 10″		88° 50′ 20″		88° 50′ 30″		88° 50′ 40″		88° 50′ 50″		Decl. H. A.
h m	′ ″		′ ″		′ ″		′ ″		′ ″		′ ″		h m
7 6	+20 33		+20 30		+20 26		+20 22		+20 20		+20 17		16 54
9	21 26	53	21 23	53	21 18	52	21 14	52	21 12	52	21 9	52	51
12	22 18	52	22 15	52	22 10	52	22 6	52	22 4	52	22 1	52	48
15	23 10	52	23 7	52	23 2	52	22 58	52	22 55	51	22 52	51	45
18	24 2	52	23 58	51	23 53	51	23 49	51	23 46	51	23 43	51	42
7 21	+24 53	51	+24 49	51	+24 44	51	+24 40	51	+24 37	51	+24 34	51	16 39
24	25 44	51	25 40	51	25 35	51	25 31	51	25 28	51	25 24	50	36
27	26 35	51	26 31	51	26 26	51	26 22	51	26 18	50	26 14	50	33
30	27 25	50	27 21	50	27 16	50	27 12	50	27 8	50	27 4	50	30
33	28 15	50	28 11	50	28 6	50	28 2	50	27 58	50	27 53	49	27
7. 36	+29 5	50	+29 1	50	+28 56	50	+28 51	49	+28 47	49	+28 42	49	16 24
39	29 54	49	29 50	49	29 45	49	29 40	49	29 36	49	29 31	49	21
42	30 44	50	30 40	50	30 34	49	30 29	49	30 25	49	30 20	49	18
45	31 33	49	31 29	49	31 23	49	31 18	49	31 14	49	31 9	49	15
48	32 22	49	32 17	48	32 11	48	32 6	48	32 2	48	31 57	48	12
7 51	+33 10	48	+33 5	48	+32 59	48	+32 54	48	+32 50	48	+32 45	48	16 9
54	33 57	47	33 53	48	33 47	48	33 42	48	33 37	47	33 32	47	6
7 57	34 45	48	34 41	48	34 35	48	34 30	48	34 24	47	34 19	47	3
8 0	35 33	48	35 28	47	35 22	47	35 17	47	35 11	47	35 6	47	16 0
3	36 20	47	36 15	47	36 9	47	36 4	47	35 58	47	35 53	47	15 57
8 6	+37 6	46	+37 1	46	+36 55	46	+36 50	46	+36 44	46	+36 39	46	15 54
9	37 52	46	37 47	46	37 41	46	37 36	46	37 30	46	37 25	46	51
12	38 38	46	38 33	46	38 27	46	38 22	46	38 16	46	38 10	45	48
15	39 24	46	39 19	46	39 12	45	39 7	45	39 1	45	38 55	45	45
18	40 9	45	40 4	45	39 57	45	39 52	45	39 45	44	39 39	44	42
8 21	+40 53	44	+40 48	44	+40 41	44	+40 36	44	+40 29	44	+40 23	44	15 39
24	41 38	45	41 32	44	41 25	44	41 20	44	41 13	44	41 6	43	36
27	42 22	44	42 16	44	42 9	44	42 3	43	41 56	43	41 49	43	33
30	43 5	43	42 59	43	42 52	43	42 46	43	42 39	43	42 32	43	30
33	43 48	43	43 42	43	43 34	42	43 28	42	43 21	42	43 14	42	27
8 36	+44 30	42	+44 24	42	+44 16	42	+44 10	42	+44 3	42	+43 56	42	15 24
39	45 12	42	45 6	42	44 58	42	44 51	41	44 45	42	44 38	42	21
42	45 54	42	45 47	41	45 39	41	45 32	41	45 26	41	45 19	41	18
45	46 35	41	46 28	41	46 20	41	46 13	41	46 7	41	46 0	41	15
48	47 15	40	47 8	40	47 0	40	46 53	40	46 47	40	46 40	40	12
8 51	+47 55	40	+47 48	40	+47 40	40	+47 33	40	+47 27	40	+47 20	40	15 9
54	48 35	40	48 28	40	48 19	39	48 12	39	48 6	39	47 59	39	6
8 57	49 14	39	49 7	39	48 58	39	48 51	39	48 45	39	48 38	39	3
9 0	49 53	39	49 45	38	49 37	39	49 30	39	49 23	38	49 16	38	15 0
3	50 31	38	50 23	38	50 15	38	50 8	38	50 1	38	49 53	37	14 57
9 6	+51 9	38	+51 1	38	+50 53	38	+50 45	37	+50 38	37	+50 30	37	14 54
9	51 46	37	51 38	37	51 30	37	51 22	37	51 15	37	51 6	36	51
12	52 22	36	52 14	36	52 6	36	51 58	36	51 51	36	51 42	36	48
15	52 57	35	52 50	36	52 42	36	52 34	36	52 26	35	52 18	36	45
18	53 32	35	53 25	35	53 17	35	53 9	35	53 1	35	52 53	35	42
9 21	+54 7	35	+54 0	35	+53 52	35	+53 44	35	+53 36	35	+53 27	34	14 39
24	54 42	35	54 34	34	54 26	34	54 18	34	54 10	34	54 1	34	36
27	55 16	34	55 8	34	54 59	33	54 51	33	54 43	33	54 34	33	33
30	55 49	33	55 41	33	55 32	33	55 24	33	55 16	33	55 7	33	30
33	56 21	32	56 13	32	56 5	33	55 57	33	55 49	33	55 40	33	27
9 36	+56 53	32	+56 45	32	+56 37	32	+56 29	32	+56 21	32	+56 12	32	14 24
39	57 25	32	57 17	32	57 9	32	57 1	32	56 52	31	56 43	31	21
42	57 56	31	57 48	31	57 40	31	57 32	31	57 23	31	57 14	31	18
45	58 26	30	58 18	30	58 10	30	58 2	30	57 53	30	57 44	30	15
48	58 56	30	58 48	30	58 39	29	58 31	29	58 22	29	58 13	29	12
9 51	+59 25	29	+59 17	29	+59 8	29	+59 0	29	+58 51	29	+58 42	29	14 9
54	59 53	28	59 45	28	59 36	28	59 28	28	59 19	28	59 10	28	6
9 57	60 21	28	60 13	28	60 4	28	59 55	27	59 46	27	59 37	27	3
10 0	60 48	27	60 40	27	60 31	27	60 22	27	60 13	27	60 4	27	14 0
10 3	+61 15	27	+61 6	26	+60 57	26	+60 48	26	+60 39	26	+60 30	26	13 57

TABLE IV.

FOR FINDING THE LATITUDE BY AN OBSERVED ALTITUDE OF POLARIS, 1912.

Decl. H. A.	88° 50′ 0″		88° 50′ 10″		88° 50′ 20″		88° 50′ 30″		88° 50′ 40″		88° 50′ 50″		Decl. H. A.
h m	′ ″		′ ″		′ ″		′ ″		′ ″		′ ″		h m
10 3	+61 15	26	+61 6	26	+60 57	26	+60 48	26	+60 39	26	+60 30	26	13 57
6	61 41	26	61 32	25	61 23	25	61 14	25	61 5	25	60 56	25	54
9	62 7	25	61 57	25	61 48	25	61 39	25	61 30	25	61 21	25	51
12	62 32	24	62 22	24	62 13	24	62 4	24	61 55	24	61 46	24	48
15	62 56	24	62 46	24	62 37	23	62 28	23	62 19	23	62 10	23	45
10 18	+63 20	23	+63 10	23	+63 0	23	+62 51	23	+62 42	23	+62 33	23	13 42
21	63 43	22	63 33	22	63 23	22	63 14	22	63 5	22	62 56	22	39
24	64 5	21	63 55	22	63 45	22	63 36	22	63 27	21	63 18	21	36
27	64 26	21	64 17	21	64 7	21	63 58	21	63 48	21	63 39	21	33
30	64 47	20	64 38	20	64 28	20	64 19	20	64 9	20	64 0	20	30
10 33	+65 7	19	+64 58	19	+64 48	20	+64 39	20	+64 29	20	+64 20	20	13 27
36	65 26	19	65 17	19	65 8	19	64 59	19	64 49	19	64 40	19	24
39	65 45	18	65 36	18	65 27	18	65 18	18	65 8	18	64 59	18	21
42	66 3	18	65 54	18	65 45	18	65 36	18	65 26	18	65 17	18	18
45	66 21	18	66 12	18	66 3	17	65 54	17	65 44	17	65 35	17	15
10 48	+66 39	16	+66 30	16	+66 20	16	+66 11	16	+66 1	16	+65 52	16	13 12
51	66 55	16	66 46	16	66 36	16	66 27	15	66 17	15	66 8	15	9
54	67 11	15	67 2	15	66 52	15	66 42	15	66 32	15	66 23	15	6
10 57	67 26	15	67 17	14	67 7	14	66 57	14	66 47	14	66 38	14	3
11 0	67 41	14	67 31	14	67 21	14	67 11	14	67 1	14	66 52	13	13 0
11 3	+67 55	13	+67 45	13	+67 35	13	+67 25	13	+67 15	13	+67 5	13	12 57
6	68 8	12	67 58	12	67 48	12	67 38	12	67 28	12	67 18	12	54
9	68 20	11	68 10	11	68 0	11	67 50	11	67 40	11	67 30	11	51
12	68 31	11	68 21	11	68 11	11	68 1	11	67 51	11	67 41	11	48
15	68 42	10	68 32	10	68 22	10	68 12	10	68 2	10	67 52	10	45
11 18	+68 52	9	+68 42	9	+68 32	9	+68 22	9	+68 12	9	+68 2	9	12 42
21	69 1	9	68 51	9	68 41	9	68 31	9	68 21	9	68 11	9	39
24	69 10	8	69 0	8	68 50	8	68 40	8	68 30	8	68 20	8	36
27	69 18	7	69 8	7	68 58	7	68 48	7	68 38	7	68 28	7	33
30	69 25	7	69 15	7	69 5	7	68 55	7	68 45	7	68 35	7	30
11 33	+69 32	6	+69 22	6	+69 12	6	+69 2	6	+68 52	6	+68 42	6	12 27
36	69 38	5	69 28	5	69 18	5	69 8	5	68 58	5	68 48	5	24
39	69 43	4	69 33	4	69 23	4	69 13	4	69 3	4	68 53	4	21
42	69 47	4	69 37	4	69 27	4	69 17	4	69 7	4	68 57	4	18
45	69 51	3	69 41	3	69 31	3	69 21	3	69 11	3	69 1	3	15
11 48	+69 54	2	+69 44	2	+69 34	2	+69 24	2	+69 14	2	+69 4	2	12 12
51	69 56	2	69 46	2	69 36	2	69 26	2	69 16	2	69 6	2	9
54	69 58	1	69 48	1	69 38	1	69 28	1	69 18	1	69 8	1	6
11 57	69 59	1	69 49	1	69 39	1	69 29	1	69 19	1	69 9	1	3
12 0	+70 0		+69 50		+69 40		+69 30		+69 20		+69 10		12 0

TABLE IVa.

Table IV has been computed for an altitude of 45°. For other altitudes, corrections taken from the following table may be applied when the desired degree of accuracy requires it.

H. A. Altitude.		10°	20°	30°	40°	50°	60°	70°	Altitude. H. A.	
h	h	″	″	″	″	″	″	″	h	h
0	12	0	0	0	0	0	0	0	12	24
1	11	− 2	− 2	− 1	0	+1	+ 2	+ 5	13	23
2	10	9	7	5	−2	2	8	18	14	22
3	9	17	13	9	3	4	15	37	15	21
4	8	26	20	13	5	6	23	55	16	20
5	7	33	25	17	7	7	29	68	17	19
6	6	−35	−27	−18	−7	+8	+31	+73	18	18

TABLE V.

AZIMUTH OF POLARIS AT ALL HOUR ANGLES, 1912.

[For hour angles 0h to 12h the star is west of north, and for hour angles 12h to 24h it is east of north.]

H.A. \ Lat.	10°	15°	20°	25°	30°	35°	40°	45°	50°	Lat. / H.A.
h m	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	h m
0 0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	24 0
12	0 3.7	0 3.8	0 4.0	0 4.2	0 4.3	0 4.6	0 4.9	0 5.3	0 5.9	48
24	0 7.4	0 7.6	0 7.9	0 8.2	0 8.5	0 9.1	0 9.7	0 10.5	0 11.7	36
36	0 11.1	0 11.3	0 11.7	0 12.1	0 12.7	0 13.5	0 14.5	0 15.7	0 17.5	24
48	0 14.8	0 15.0	0 15.5	0 16.0	0 16.8	0 17.9	0 19.2	0 20.9	0 23.2	12
1 0	0 18.4	0 18.7	0 19.3	0 20.0	0 21.0	0 22.3	0 23.9	0 26.0	0 28.8	23 0
12	0 22.0	0 22.4	0 23.1	0 24.0	0 25.2	0 26.7	0 28.6	0 31.1	0 34.3	48
24	0 25.5	0 26.0	0 26.8	0 27.9	0 29.2	0 31.0	0 33.1	0 36.0	0 39.7	36
36	0 28.9	0 29.5	0 30.3	0 31.6	0 33.1	0 35.1	0 37.6	0 40.8	0 45.1	24
48	0 32.2	0 32.9	0 33.8	0 35.2	0 36.9	0 39.1	0 41.9	0 45.5	0 50.3	12
2 0	0 35.5	0 36.3	0 37.3	0 38.8	0 40.7	0 43.1	0 46.1	0 50.1	0 55.4	22 0
12	0 38.7	0 39.5	0 40.6	0 42.3	0 44.3	0 47.0	0 50.2	0 54.6	1 0.3	48
24	0 41.8	0 42.6	0 43.8	0 45.7	0 47.8	0 50.7	0 54.2	0 58.9	1 5.0	36
36	0 44.6	0 45.6	0 46.9	0 48.8	0 51.2	0 54.2	0 58.0	1 3.0	1 9.6	24
48	0 47.4	0 48.4	0 49.9	0 51.9	0 54.3	0 57.5	1 1.6	1 6.9	1 13.9	12
3 0	0 50.1	0 51.2	0 52.8	0 54.8	0 57.3	1 0.7	1 5.1	1 10.7	1 18.1	21 0
12	0 52.7	0 53.8	0 55.4	0 57.5	1 0.3	1 3.8	1 8.4	1 14.3	1 22.1	48
24	0 55.2	0 56.2	0 58.0	1 0.1	1 3.1	1 6.7	1 11.5	1 17.6	1 25.7	36
36	0 57.4	0 58.5	1 0.3	1 2.5	1 5.6	1 9.4	1 14.3	1 20.6	1 29.0	24
48	0 59.5	1 0.6	1 2.4	1 4.8	1 7.9	1 11.9	1 17.0	1 23.5	1 32.1	12
4 0	1 1.4	1 2.6	1 4.4	1 6.9	1 10.0	1 14.2	1 19.5	1 26.2	1 35.0	20 0
12	1 3.2	1 4.4	1 6.3	1 8.8	1 12.0	1 16.2	1 21.8	1 28.7	1 37.8	48
24	1 4.8	1 6.1	1 8.0	1 10.5	1 13.8	1 18.1	1 23.8	1 30.9	1 40.2	36
36	1 6.1	1 7.5	1 9.4	1 12.0	1 15.4	1 19.8	1 25.5	1 32.7	1 42.2	24
48	1 7.3	1 8.7	1 10.7	1 13.3	1 16.8	1 21.3	1 27.0	1 34.3	1 43.9	12
5 0	1 8.4	1 9.7	1 11.8	1 14.4	1 18.0	1 22.5	1 28.3	1 35.7	1 45.4	19 0
12	1 9.2	1 10.6	1 12.6	1 15.3	1 19.0	1 23.5	1 29.3	1 36.8	1 46.6	48
24	1 9.9	1 11.3	1 13.3	1 16.0	1 19.7	1 24.2	1 30.1	1 37.6	1 47.5	36
36	1 10.4	1 11.8	1 13.8	1 16.5	1 20.2	1 24.7	1 30.6	1 38.2	1 48.1	24
48	1 10.7	1 12.1	1 14.1	1 16.8	1 20.5	1 25.0	1 30.9	1 38.5	1 48.4	12
6 0	1 10.7	1 12.1	1 14.1	1 16.9	1 20.5	1 25.0	1 31.0	1 38.6	1 48.4	18 0
12	1 10.7	1 12.0	1 14.1	1 16.8	1 20.4	1 24.9	1 30.8	1 38.4	1 48.0	48
24	1 10.4	1 11.7	1 13.8	1 16.5	1 20.0	1 24.5	1 30.4	1 37.8	1 47.4	36
36	1 9.9	1 11.2	1 13.2	1 15.9	1 19.4	1 23.9	1 29.7	1 37.0	1 46.6	24
48	1 9.2	1 10.5	1 12.4	1 15.0	1 18.5	1 23.0	1 28.7	1 35.9	1 45.5	12
7 0	1 8.3	1 9.6	1 11.5	1 14.1	1 17.5	1 21.9	1 27.5	1 34.6	1 44.1	17 0
12	1 7.2	1 8.5	1 10.4	1 12.9	1 16.3	1 20.6	1 26.1	1 33.0	1 42.4	48
24	1 6.0	1 7.2	1 9.1	1 11.6	1 14.9	1 19.1	1 24.5	1 31.2	1 40.3	36
36	1 4.5	1 5.8	1 7.6	1 10.1	1 13.2	1 17.4	1 22.6	1 29.2	1 38.0	24
48	1 2.9	1 4.1	1 5.9	1 8.3	1 11.3	1 15.4	1 20.5	1 27.0	1 35.5	12
8 0	1 1.1	1 2.3	1 4.0	1 6.3	1 9.3	1 13.2	1 18.1	1 24.5	1 32.7	16 0
12	0 59.2	1 0.3	1 1.9	1 4.1	1 7.0	1 10.8	1 15.6	1 21.7	1 29.7	48
24	0 57.2	0 58.1	0 59.7	1 1.8	1 4.6	1 8.3	1 12.9	1 18.7	1 26.5	36
36	0 55.0	0 55.9	0 57.4	0 59.4	1 2.1	1 5.6	1 10.0	1 15.5	1 22.9	24
48	0 52.5	0 53.4	0 54.9	0 56.8	0 59.3	1 2.6	1 6.9	1 12.2	1 19.2	12
9 0	0 49.9	0 50.8	0 52.2	0 54.1	0 56.4	0 59.5	1 3.6	1 8.7	1 15.3	15 0
12	0 47.1	0 48.0	0 49.3	0 51.1	0 53.4	0 56.3	1 0.1	1 4.9	1 11.2	48
24	0 44.3	0 45.1	0 46.3	0 48.0	0 50.2	0 53.0	0 56.5	1 1.0	1 7.0	36
36	0 41.5	0 42.2	0 43.3	0 44.8	0 46.9	0 49.5	0 52.8	0 57.0	1 2.6	24
48	0 38.5	0 39.1	0 40.1	0 41.5	0 43.5	0 45.8	0 48.8	0 52.8	0 58.0	12
10 0	0 35.3	0 35.9	0 36.8	0 38.2	0 39.9	0 42.0	0 44.8	0 48.5	0 53.2	14 0
12	0 32.0	0 32.5	0 33.4	0 34.6	0 36.2	0 38.1	0 40.6	0 44.0	0 48.2	48
24	0 28.7	0 29.1	0 29.9	0 31.0	0 32.5	0 34.1	0 36.4	0 39.4	0 43.2	36
36	0 25.3	0 25.6	0 26.3	0 27.3	0 28.7	0 30.1	0 32.1	0 34.7	0 38.0	24
48	0 21.8	0 22.1	0 22.7	0 23.5	0 24.7	0 25.9	0 27.7	0 29.9	0 32.8	12
11 0	0 18.2	0 18.5	0 19.0	0 19.7	0 20.6	0 21.7	0 23.2	0 25.0	0 27.4	13 0
12	0 14.6	0 14.9	0 15.3	0 15.8	0 16.5	0 17.4	0 18.6	0 20.1	0 22.0	48
24	0 11.0	0 11.3	0 11.6	0 11.9	0 12.4	0 13.1	0 14.0	0 15.1	0 16.6	36
36	0 7.4	0 7.6	0 7.8	0 7.9	0 8.3	0 8.8	0 9.4	0 10.1	0 11.1	24
48	0 3.7	0 3.8	0 3.9	0 4.0	0 4.2	0 4.4	0 4.7	0 5.1	0 5.6	12
12 0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	12 0

TABLE V.

AZIMUTH OF POLARIS AT ALL HOUR ANGLES, 1912.

[For hour angles 0h to 12h the star is west of north, and for hour angles 12h to 24h it is east of north.]

H.A. \ Lat.	52°	54°	56°	58°	60°	61°	62°	63°	64°	Lat. / H.A.
h m	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	h m
0 0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	24 0
12	0 6.1	0 6.4	0 6.8	0 7.1	0 7.6	0 7.8	0 8.1	0 8.3	0 8.7	48
24	0 12.1	0 12.8	0 13.5	0 14.2	0 15.2	0 15.6	0 16.2	0 16.7	0 17.3	36
36	0 18.1	0 19.1	0 20.1	0 21.2	0 22.7	0 23.3	0 24.2	0 25.0	0 25.9	24
48	0 24.1	0 25.4	0 26.7	0 28.3	0 30.1	0 31.0	0 32.2	0 33.3	0 34.5	12
1 0	0 30.0	0 31.6	0 33.2	0 35.2	0 37.4	0 38.5	0 40.0	0 41.4	0 42.9	23 0
12	0 35.8	0 37.7	0 39.6	0 42.0	0 44.5	0 45.9	0 47.6	0 49.3	0 51.2	48
24	0 41.5	0 43.7	0 45.9	0 48.6	0 51.6	0 53.3	0 55.1	0 57.1	0 59.4	36
36	0 47.0	0 49.5	0 52.1	0 55.1	0 58.6	1 0.5	1 2.5	1 4.8	1 7.3	24
48	0 52.5	0 55.2	0 58.1	1 1.4	1 5.4	1 7.5	1 9.8	1 12.3	1 15.0	12
2 0	0 57.8	1 0.7	1 4.0	1 7.7	1 11.9	1 14.3	1 16.9	1 19.6	1 22.6	22 0
12	1 3.0	1 6.1	1 9.7	1 13.7	1 18.2	1 21.0	1 23.7	1 26.6	1 29.9	48
24	1 8.0	1 11.3	1 15.1	1 19.5	1 24.3	1 27.3	1 30.2	1 33.4	1 37.0	36
36	1 12.7	1 16.3	1 20.3	1 25.0	1 30.2	1 33.3	1 36.5	1 39.8	1 43.7	24
48	1 17.2	1 21.0	1 25.2	1 30.2	1 35.8	1 38.9	1 42.4	1 46.0	1 50.0	12
3 0	1 21.6	1 25.5	1 30.0	1 35.2	1 41.1	1 44.4	1 48.0	1 51.8	1 55.9	21 0
12	1 25.7	1 29.8	1 34.5	1 39.9	1 46.1	1 49.6	1 53.3	1 57.3	2 1.6	48
24	1 29.5	1 33.8	1 38.7	1 44.3	1 50.7	1 54.4	1 58.3	2 2.4	2 6.9	36
36	1 33.0	1 37.4	1 42.6	1 48.4	1 55.1	1 58.9	2 3.0	2 7.2	2 11.9	24
48	1 36.2	1 40.9	1 46.2	1 52.3	1 59.1	2 3.0	2 7.2	2 11.6	2 16.5	12
4 0	1 39.3	1 44.1	1 49.6	1 55.8	2 2.8	2 6.9	2 11.1	2 15.6	2 20.7	20 0
12	1 42.1	1 47.0	1 52.6	1 58.9	2 6.2	2 10.3	2 14.7	2 19.3	2 24.4	48
24	1 44.5	1 49.5	1 55.3	2 1.8	2 9.2	2 13.3	2 17.8	2 22.5	2 27.8	36
36	1 46.6	1 51.7	1 57.6	2 4.2	2 11.7	2 15.9	2 20.5	2 25.3	2 30.7	24
48	1 48.5	1 53.7	1 59.6	2 6.4	2 13.9	2 18.2	2 22.8	2 27.7	2 33.2	12
5 0	1 50.1	1 55.4	2 1.3	2 8.2	2 15.8	2 20.2	2 24.8	2 29.8	2 35.3	19 0
12	1 51.3	1 56.7	2 2.6	2 9.6	2 17.3	2 21.8	2 26.4	2 31.4	2 36.9	48
24	1 52.2	1 57.7	2 3.6	2 10.6	2 18.4	2 22.9	2 27.5	2 32.6	2 38.1	36
36	1 52.9	1 58.3	2 4.2	2 11.1	2 19.1	2 23.5	2 28.2	2 33.3	2 38.8	24
48	1 53.2	1 58.6	2 4.5	2 11.4	2 19.4	2 23.8	2 28.5	2 33.6	2 39.1	12
6 0	1 53.2	1 58.6	2 4.5	2 11.4	2 19.3	2 23.7	2 28.4	2 33.5	2 38.9	18 0
12	1 52.9	1 58.3	2 4.1	2 11.0	2 18.9	2 23.2	2 27.9	2 32.9	2 38.3	48
24	1 52.2	1 57.6	2 3.4	2 10.2	2 18.0	2 22.3	2 27.0	2 32.0	2 37.3	36
36	1 51.3	1 56.6	2 2.3	2 9.1	2 16.8	2 21.1	2 25.7	2 30.7	2 36.0	24
48	1 50.0	1 55.3	2 1.0	2 7.7	2 15.3	2 19.5	2 24.0	2 28.9	2 34.2	12
7 0	1 48.5	1 53.7	1 59.4	2 5.9	2 13.3	2 17.5	2 21.9	2 26.7	2 31.9	17 0
12	1 46.7	1 51.8	1 57.4	2 3.7	2 11.0	2 15.1	2 19.4	2 24.2	2 29.2	48
24	1 44.6	1 49.6	1 55.0	2 1.3	2 8.4	2 12.4	2 16.6	2 21.3	2 26.2	36
36	1 42.3	1 47.2	1 52.4	1 58.5	2 5.5	2 9.4	2 13.4	2 18.0	2 22.8	24
48	1 39.7	1 44.4	1 49.5	1 55.5	2 2.2	2 6.0	2 9.9	2 14.3	2 19.0	12
8 0	1 36.8	1 41.3	1 46.2	1 52.0	1 58.5	2 2.2	2 6.1	2 10.3	2 14.8	16 0
12	1 33.6	1 37.9	1 42.7	1 48.3	1 54.6	1 58.1	2 1.9	2 5.9	2 10.3	48
24	1 30.2	1 34.3	1 39.0	1 44.3	1 50.4	1 53.8	1 57.4	2 1.3	2 5.5	36
36	1 26.6	1 30.5	1 35.0	1 40.1	1 45.9	1 49.1	1 52.6	1 56.3	2 0.3	24
48	1 22.8	1 26.5	1 30.8	1 35.6	1 41.2	1 44.2	1 47.6	1 51.1	1 54.9	12
9 0	1 18.7	1 22.2	1 26.3	1 30.8	1 36.1	1 39.0	1 42.2	1 45.5	1 49.2	15 0
12	1 14.3	1 17.7	1 21 5	1 25.9	1 30.8	1 33.6	1 36.5	1 39.7	1 43.2	48
24	1 9.8	1 13.0	1 16.6	1 20.7	1 25.4	1 28.0	1 30.7	1 33.7	1 36.9	36
36	1 5.2	1 8.1	1 11.5	1 15.3	1 19.7	1 22.0	1 24.6	1 27.5	1 30.4	24
48	1 0.3	1 3.1	1 6.2	1 9.7	1 13.7	1 15.9	1 18.3	1 20.9	1 23.6	12
10 0	0 55.3	0 57.9	1 0.7	1 3.9	1 7.5	1 9.6	1 11.8	1 14.2	1 16.7	14 0
12	0 50.2	0 52.6	0 55.0	0 58.0	1 1.2	1 3.1	1 5.2	1 7.3	1 9.6	48
24	0 44.9	0 47.1	0 49.3	0 52.0	0 54.8	0 56.5	0 58.4	1 0.2	1 2.3	36
36	0 39.6	0 41.5	0 43.4	0 45.7	0 48.3	0 49.8	0 51.4	0 53.0	0 54.8	24
48	0 34.1	0 35.7	0 37.4	0 39.4	0 41.6	0 42.9	0 44.3	0 45.7	0 47.2	12
11 0	0 28.6	0 29.9	0 31.3	0 33.0	0 34.8	0 35.9	0 37.1	0 38.3	0 39.6	13 0
12	0 22.9	0 24.0	0 25.2	0 26.5	0 28.0	0 28.9	0 29.8	0 30.8	0 31.8	48
24	0 17.2	0 18.1	0 19.0	0 19.9	0 21.0	0 21.7	0 22.4	0 23.1	0 23.9	36
36	0 11.5	0 12.1	0 12.7	0 13.3	0 14.0	0 14.5	0 15.0	0 15.4	0 16.0	24
48	0 5.8	0 6.1	0 6.4	0 6.7	0 7.0	0 7.3	0 7.5	0 7.7	0 8.0	12
12 0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.	

TABLE VI.

AZIMUTH OF POLARIS AT ELONGATION, 1912.

Decl. / Lat.	88° 50′ 0″	88° 50′ 10″	88° 50′ 20″	88° 50′ 30″	88° 50′ 40″	88° 50′ 50″	Variation for— 1′ of Lat.	Variation for— 1″ of δ
° ′	° ′ ″	° ′ ″	° ′ ″	° ′ ″	° ′ ″	° ′ ″	″	″
5 0	1 10 16.0	1 10 6.0	1 9 56.0	1 9 45.9	1 9 35.9	1 9 25.9	+0.11	−1.00
5 20	1 10 18.3	1 10 8.2	1 9 58.2	1 9 48.1	1 9 38.1	1 9 28.0	0.12	1.00
5 40	1 10 20.6	1 10 10.6	1 10 0.5	1 9 50.4	1 9 40.4	1 9 30.4	0.12	1.00
6 0	1 10 23.1	1 10 13.1	1 10 3.0	1 9 52.9	1 9 42.9	1 9 32.9	0.13	1.00
6 20	1 10 25.8	1 10 15.7	1 10 5.7	1 9 55.6	1 9 45.6	1 9 35.5	0.14	1.01
6 40	1 10 28.6	1 10 18.5	1 10 8.5	1 9 58.4	1 9 48.3	1 9 38.3	+0.14	−1.01
7 0	1 10 31.5	1 10 21.5	1 10 11.4	1 10 1.3	1 9 51.2	1 9 41.2	0.15	1.01
7 20	1 10 34.6	1 10 24.6	1 10 14.5	1 10 4.4	1 9 54.3	1 9 44.2	0.15	1.01
7 40	1 10 37.9	1 10 27.8	1 10 17.7	1 10 7.6	1 9 57.5	1 9 47.4	0.16	1.01
8 0	1 10 41.3	1 10 31.2	1 10 21.1	1 10 11.0	1 10 0.9	1 9 50.8	0.17	1.01
8 20	1 10 44.8	1 10 34.7	1 10 24.6	1 10 14.5	1 10 4.4	1 9 54.3	+0.18	−1.01
8 40	1 10 48.5	1 10 38.4	1 10 28.3	1 10 18.2	1 10 8.1	1 9 57.9	0.19	1.01
9 0	1 10 52.4	1 10 42.2	1 10 32.1	1 10 22.0	1 10 11.9	1 10 1.7	0.20	1.01
9 20	1 10 56.4	1 10 46.2	1 10 36.1	1 10 26.0	1 10 15.8	1 10 5.7	0.20	1.01
9 40	1 11 0.5	1 10 50.4	1 10 40.2	1 10 30.1	1 10 19.9	1 10 9.8	0.21	1.01
10 0	1 11 4.8	1 10 54.7	1 10 44.5	1 10 34.3	1 10 24.2	1 10 14.0	+0.22	−1.02
10 20	1 11 9.2	1 10 59.1	1 10 48.9	1 10 38.7	1 10 28.6	1 10 18.4	0.23	1.02
10 40	1 11 13.8	1 11 3.7	1 10 53.5	1 10 43.3	1 10 33.1	1 10 23.0	0.23	1.02
11 0	1 11 18.6	1 11 8.4	1 10 58.2	1 10 48.0	1 10 37.8	1 10 27.7	0.24	1.02
11 20	1 11 23.5	1 11 13.3	1 11 3.1	1 10 52.9	1 10 42.7	1 10 32.5	0.25	1.02
11 40	1 11 28.6	1 11 18.4	1 11 8.2	1 10 57.9	1 10 47.7	1 10 37.5	+0.26	−1.02
12 0	1 11 33.8	1 11 23.6	1 11 13.4	1 11 3.1	1 10 52.9	1 10 42.7	0.26	1.02
12 20	1 11 39.2	1 11 29.0	1 11 18.7	1 11 8.5	1 10 58.3	1 10 48.0	0.27	1.02
12 40	1 11 44.8	1 11 34.5	1 11 24.3	1 11 14.0	1 11 3.8	1 10 53.5	0.28	1.03
13 0	1 11 50.5	1 11 40.2	1 11 30.0	1 11 19.7	1 11 9.4	1 10 59.2	0.29	1.03
13 20	1 11 56.4	1 11 46.1	1 11 35.8	1 11 25.5	1 11 15.2	1 11 5.0	+0.30	−1.03
13 40	1 12 2.4	1 11 52.1	1 11 41.8	1 11 31.5	1 11 21.2	1 11 10.9	0.31	1.03
14 0	1 12 8.6	1 11 58.3	1 11 48.0	1 11 37.7	1 11 27.4	1 11 17.0	0.31	1.03
14 20	1 12 15.0	1 12 4.6	1 11 54.3	1 11 44.0	1 11 33.7	1 11 23.3	0.32	1.03
14 40	1 12 21.5	1 12 11.1	1 12 0.8	1 11 50.5	1 11 40.1	1 11 29.8	0.33	1.03
15 0	1 12 28.2	1 12 17.8	1 12 7.5	1 11 57.1	1 11 46.7	1 11 36.4	+0.34	−1.04
15 20	1 12 35.0	1 12 24.7	1 12 14.3	1 12 3.9	1 11 53.5	1 11 43.2	0.34	1.04
15 40	1 12 42.1	1 12 31.7	1 12 21.3	1 12 10.9	1 12 0.5	1 11 50.1	0.35	1.04
16 0	1 12 49.3	1 12 38.9	1 12 28.5	1 12 18.0	1 12 7.6	1 11 57.2	0.36	1.04
16 20	1 12 56.7	1 12 46.2	1 12 35.8	1 12 25.4	1 12 14.9	1 12 4.5	0.37	1.04
16 40	1 13 4.2	1 12 53.8	1 12 43.3	1 12 32.9	1 12 22.4	1 12 12.0	+0.38	−1.04
17 0	1 13 11.9	1 13 1.5	1 12 51.0	1 12 40.5	1 12 30.1	1 12 19.6	0.39	1.05
17 20	1 13 19.8	1 13 9.4	1 12 58.9	1 12 48.4	1 12 37.9	1 12 27.4	0.40	1.05
17 40	1 13 27.9	1 13 17.4	1 13 6.9	1 12 56.4	1 12 45.9	1 12 35.4	0.40	1.05
18 0	1 13 36.2	1 13 25.7	1 13 15.1	1 13 4.6	1 12 54.1	1 12 43.6	0.41	1.05
18 20	1 13 44.6	1 13 34.1	1 13 23.5	1 13 13.0	1 13 2.5	1 12 51.9	+0.42	−1.05
18 40	1 13 53.2	1 13 42.7	1 13 32.1	1 13 21.6	1 13 11.0	1 13 0.5	0.43	1.06
19 0	1 14 2.0	1 13 51.5	1 13 40.9	1 13 30.3	1 13 19.7	1 13 9.2	0.44	1.06
19 20	1 14 11.0	1 14 0.4	1 13 49.9	1 13 39.2	1 13 28.6	1 13 18.0	0.45	1.06
19 40	1 14 20.2	1 14 9.6	1 13 59.0	1 13 48.3	1 13 37.7	1 13 27.1	0.46	1.06
20 0	1 14 29.6	1 14 18.9	1 14 8.3	1 13 57.6	1 13 47.0	1 13 36.4	+0.47	−1.06
20 20	1 14 39.1	1 14 28.5	1 14 17.8	1 14 7.1	1 13 56.5	1 13 45.8	0.48	1.07
20 40	1 14 48.9	1 14 38.2	1 14 27.5	1 14 16.8	1 14 6.1	1 13 55.4	0.49	1.07
21 0	1 14 58.8	1 14 48.1	1 14 37.4	1 14 26.7	1 14 16.0	1 14 5.3	0.50	1.07
21 20	1 15 9.0	1 14 58.2	1 14 47.5	1 14 36.8	1 14 26.0	1 14 15.3	0.51	1.07
21 40	1 15 19.3	1 15 8.6	1 14 57.8	1 14 47.0	1 14 36.3	1 14 25.5	+0.52	−1.08
22 0	1 15 29.9	1 15 19.1	1 15 8.3	1 14 57.5	1 14 46.7	1 14 36.0	0.53	1.08
22 20	1 15 40.6	1 15 29.8	1 15 19.0	1 15 8.2	1 14 57.4	1 14 46.6	0.54	1.08
22 40	1 15 51.6	1 15 40.8	1 15 29.9	1 15 19.1	1 15 8.2	1 14 57.4	0.55	1.08
23 0	1 16 2.8	1 15 51.9	1 15 41.0	1 15 30.2	1 15 19.3	1 15 8.4	0.56	1.09
23 20	1 16 14.1	1 16 3.2	1 15 52.4	1 15 41.5	1 15 30.6	1 15 19.7	+0.57	−1.09
23 40	1 16 25.7	1 16 14.8	1 16 3.9	1 15 53.0	1 15 42.0	1 15 31.1	0.58	1.09
24 0	1 16 37.5	1 16 26.6	1 16 15.6	1 16 4.7	1 15 53.7	1 15 42.8	0.59	1.09
24 20	1 16 49.5	1 16 38.6	1 16 27.6	1 16 16.6	1 16 5.6	1 15 54.7	0.60	1.10
24 40	1 17 1.8	1 16 50.8	1 16 39.8	1 16 28.7	1 16 17.7	1 16 6.8	0.61	1.10
25 0	1 17 14.2	1 17 3.2	1 16 52.2	1 16 41.1	1 16 30.1	1 16 19.1	+0.62	−1.10

TABLE VI.

AZIMUTH OF POLARIS AT ELONGATION, 1912.

Decl. / Lat.	88° 50′ 0″	88° 50′ 10″	88° 50′ 20″	88° 50′ 30″	88° 50′ 40″	88° 50′ 50″	Variation for—	
							1′ of Lat.	1″ of δ.
° ′	° ′ ″	° ′ ″	° ′ ″	° ′ ″	° ′ ″	° ′ ″	″	″
25 0	1 17 14.2	1 17 3.2	1 16 52.2	1 16 41.1	1 16 30.1	1 16 19.1	+0.62	−1.10
25 20	1 17 26.9	1 17 15.9	1 17 4.8	1 16 53.7	1 16 42.7	1 16 31.6	0.64	1.11
25 40	1 17 39.8	1 17 28.8	1 17 17.7	1 17 6.6	1 16 55.5	1 16 44.4	0.65	1.11
26 0	1 17 53.0	1 17 41.9	1 17 30.7	1 17 19.6	1 17 8.5	1 16 57.4	0.66	1.11
26 20	1 18 6.4	1 17 55.2	1 17 44.0	1 17 32.9	1 17 21.7	1 17 10.6	0.67	1.12
26 40	1 18 20.0	1 18 8.8	1 17 57.6	1 17 46.4	1 17 35.2	1 17 24.0	+0.68	−1.12
27 0	1 18 33.8	1 18 22.6	1 18 11.4	1 18 0.2	1 17 48.9	1 17 37.7	0.70	1.12
27 20	1 18 47.9	1 18 36.7	1 18 25.4	1 18 14.2	1 18 2.9	1 17 51.6	0.71	1.13
27 40	1 19 2.3	1 18 51.0	1 18 39.7	1 18 28.4	1 18 17.1	1 18 5.8	0.72	1.13
28 0	1 19 16.9	1 19 5.5	1 18 54.2	1 18 42.9	1 18 31.6	1 18 20.2	0.73	1.13
28 20	1 19 31.7	1 19 20.3	1 19 9.0	1 18 57.6	1 18 46.3	1 18 34.9	+0.74	−1.14
28 40	1 19 46.8	1 19 35.4	1 19 24.0	1 19 12.6	1 19 1.2	1 18 49.8	0.75	1.14
29 0	1 20 2.2	1 19 50.7	1 19 39.3	1 19 27.9	1 19 16.4	1 19 5.0	0.77	1.14
29 20	1 20 17.8	1 20 6.3	1 19 54.8	1 19 43.4	1 19 31.9	1 19 20.4	0.78	1.15
29 40	1 20 33.7	1 20 22.2	1 20 10.7	1 19 59.2	1 19 47.6	1 19 36.1	0.80	1.15
30 0	1 20 49.8	1 20 38.3	1 20 26.7	1 20 15.2	1 20 3.6	1 19 52.1	+0.81	−1.15
30 10	1 20 58.0	1 20 46.4	1 20 34.8	1 20 23.3	1 20 11.7	1 20 0.1	0.82	1.16
30 20	1 21 6.3	1 20 54.7	1 20 43.0	1 20 31.5	1 20 19.9	1 20 8.3	0.82	1.16
30 30	1 21 14.6	1 21 3.0	1 20 51.3	1 20 39.7	1 20 28.1	1 20 16.5	0.83	1.16
30 40	1 21 23.0	1 21 11.4	1 20 59.7	1 20 48.1	1 20 36.4	1 20 24.8	0.84	1.16
30 50	1 21 31.5	1 21 19.9	1 21 8.2	1 20 56.5	1 20 44.8	1 20 33.1	+0.85	−1.16
31 0	1 21 40.0	1 21 28.4	1 21 16.7	1 21 5.0	1 20 53.3	1 20 41.6	0.85	1.17
31 10	1 21 48.6	1 21 37.0	1 21 25.3	1 21 13.5	1 21 1.8	1 20 50.1	0.86	1.17
31 20	1 21 57.3	1 21 45.6	1 21 33.9	1 21 22.1	1 21 10.4	1 20 58.7	0.87	1.17
31 30	1 22 6.0	1 21 54.3	1 21 42.6	1 21 30.8	1 21 19.1	1 21 7.4	0.88	1.17
31 40	1 22 14.8	1 22 3.1	1 21 51.3	1 21 39.6	1 21 27.8	1 21 16.1	+0.88	−1.18
31 50	1 22 23.7	1 22 12.0	1 22 0.2	1 21 48.4	1 21 36.6	1 21 24.8	0.89	1.18
32 0	1 22 32.7	1 22 20.9	1 22 9.1	1 21 57.3	1 21 45.5	1 21 33.7	0.90	1.18
32 10	1 22 41.7	1 22 29.9	1 22 18.1	1 22 6.3	1 21 54.5	1 21 42.7	0.90	1.18
32 20	1 22 50.8	1 22 39.0	1 22 27.2	1 22 15.3	1 22 3.5	1 21 51.7	0.91	1.18
32 30	1 23 0.0	1 22 48.2	1 22 36.3	1 22 24.5	1 22 12.6	1 22 0.8	+0.92	−1.19
32 40	1 23 9.3	1 22 57.4	1 22 45.5	1 22 33.7	1 22 21.8	1 22 9.9	0.93	1.19
32 50	1 23 18.7	1 23 6.8	1 22 54.8	1 22 43.0	1 22 31.1	1 22 19.2	0.93	1.19
33 0	1 23 28.1	1 23 16.2	1 23 4.2	1 22 52.3	1 22 40.4	1 22 28.5	0.94	1.19
33 10	1 23 37.6	1 23 25.7	1 23 13.7	1 23 1.8	1 22 49.8	1 22 37.9	0.95	1.20
33 20	1 23 47.2	1 23 35.2	1 23 23.2	1 23 11.3	1 22 59.3	1 22 47.3	+0.96	−1.20
33 30	1 23 56.9	1 23 44.9	1 23 32.9	1 23 20.9	1 23 8.9	1 22 56.9	0.96	1.20
33 40	1 24 6.6	1 23 54.6	1 23 42.6	1 23 30.5	1 23 18.5	1 23 6.5	0.97	1.20
33 50	1 24 16.4	1 24 4.4	1 23 52.3	1 23 40.3	1 23 28.2	1 23 16.2	0.98	1.20
34 0	1 24 26.3	1 24 14.3	1 24 2.2	1 23 50.1	1 23 38.0	1 23 26.0	0.99	1.21
34 10	1 24 36.3	1 24 24.3	1 24 12.2	1 24 0.0	1 23 47.9	1 23 35.8	+1.00	−1.21
34 20	1 24 46.4	1 24 34.3	1 24 22.2	1 24 10.0	1 23 57.9	1 23 45.8	1.00	1.21
34 30	1 24 56.5	1 24 44.4	1 24 32.3	1 24 20.1	1 24 8.0	1 23 55.9	1.01	1.21
34 40	1 25 6.7	1 24 54.6	1 24 42.4	1 24 30.3	1 24 18.1	1 24 6.0	1.02	1.22
34 50	1 25 17.0	1 25 4.9	1 24 52.7	1 24 40.5	1 24 28.3	1 24 16.1	1.03	1.22
35 0	1 25 27.4	1 25 15.2	1 25 3.0	1 24 50.8	1 24 38.6	1 24 26.4	+1.04	−1.22
35 10	1 25 37.9	1 25 25.6	1 25 13.4	1 25 1.2	1 24 49.0	1 24 36.8	1.05	1.22
35 20	1 25 48.5	1 25 36.2	1 25 24.0	1 25 11.7	1 24 59.5	1 24 47.3	1.06	1.23
35 30	1 25 59.2	1 25 46.9	1 25 34.6	1 25 22.3	1 25 10.1	1 24 57.8	1.06	1.23
35 40	1 26 10.0	1 25 57.7	1 25 45.3	1 25 33.0	1 25 20.7	1 25 8.4	1.07	1.23
35 50	1 26 20.8	1 26 8.5	1 25 56.1	1 25 43.8	1 25 31.4	1 25 19.1	+1.08	−1.23
36 0	1 26 31.7	1 26 19.4	1 26 7.0	1 25 54.6	1 25 42.2	1 25 29.9	1.09	1.24
36 10	1 26 42.7	1 26 30.4	1 26 18.0	1 26 5.5	1 25 53.1	1 25 40.7	1.10	1.24
36 20	1 26 53.8	1 26 41.4	1 26 29.0	1 26 16.5	1 26 4.1	1 25 51.7	1.11	1.24
36 30	1 27 5.0	1 26 52.5	1 26 40.1	1 26 27.6	1 26 15.2	1 26 2.8	1.12	1.24
36 40	1 27 16.3	1 27 3.8	1 26 51.3	1 26 38.9	1 26 26.4	1 26 14.0	+1.13	−1.25
36 50	1 27 27.7	1 27 15.2	1 27 2.7	1 26 50.2	1 26 37.7	1 26 25.2	1.14	1.25
37 0	1 27 39.2	1 27 26.7	1 27 14.1	1 27 1.6	1 26 49.1	1 26 36.6	1.15	1.25
37 10	1 27 50.8	1 27 38.2	1 27 25.6	1 27 13.1	1 27 0.6	1 26 48.1	1.15	1.25
37 20	1 28 2.4	1 27 49.8	1 27 37.2	1 27 24.7	1 27 12.1	1 26 59.6	1.16	1.26
37 30	1 28 14.2	1 28 1.5	1 27 48.9	1 27 36.3	1 27 23.7	1 27 11.1	+1.17	−1.26

TABLE VI.

AZIMUTH OF POLARIS AT ELONGATION, 1912.

Decl. / Lat.	88° 50′ 0″	88° 50′ 10″	88° 50′ 20″	88° 50′ 30″	88° 50′ 40″	88° 50′ 50″	Variation for—	
							1′ of Lat.	1″ of δ.
° ′	° ′ ″	° ′ ″	° ′ ″	° ′ ″	° ′ ″	° ′ ″	″	″
37 30	1 28 14.2	1 28 1.5	1 27 48.9	1 27 36.3	1 27 23.7	1 27 11.1	+1.17	−1.26
37 40	1 28 26.1	1 28 13.4	1 28 0.8	1 27 48.1	1 27 35.5	1 27 22.9	1.18	1.26
37 50	1 28 38.1	1 28 25.4	1 28 12.7	1 28 0.0	1 27 47.4	1 27 34.7	1.19	1.27
38 0	1 28 50.1	1 28 37.4	1 28 24.7	1 28 12.0	1 27 59.3	1 27 46.6	1.20	1.27
38 10	1 29 2.3	1 28 49.5	1 28 36.8	1 28 24.0	1 28 11.3	1 27 58.6	1.21	1.27
38 20	1 29 14.6	1 29 1.8	1 28 49.0	1 28 36.2	1 28 23.5	1 28 10.8	+1.22	−1.27
38 30	1 29 27.0	1 29 14.2	1 29 1.4	1 28 48.5	1 28 35.8	1 28 23.0	1.23	1.28
38 40	1 29 39.4	1 29 26.6	1 29 13.8	1 29 0.9	1 28 48.1	1 28 35.3	1.24	1.28
38 50	1 29 52.0	1 29 39.1	1 29 26.2	1 29 13.4	1 29 0.5	1 28 47.7	1.25	1.28
39 0	1 30 4.7	1 29 51.8	1 29 38.9	1 29 26.0	1 29 13.1	1 29 0.3	1.26	1.29
39 10	1 30 17.5	1 30 4.6	1 29 51.6	1 29 38.7	1 29 25.8	1 29 12.9	+1.27	−1.29
39 20	1 30 30.3	1 30 17.4	1 30 4.4	1 29 51.5	1 29 38.6	1 29 25.6	1.28	1.29
39 30	1 30 43.3	1 30 30.4	1 30 17.4	1 30 4.4	1 29 51.4	1 29 38.4	1.30	1.30
39 40	1 30 56.4	1 30 43.4	1 30 30.4	1 30 17.4	1 30 4.3	1 29 51.3	1.31	1.30
39 50	1 31 9.7	1 30 56.6	1 30 43.5	1 30 30.5	1 30 17.4	1 30 4.4	1.32	1.30
40 0	1 31 23.0	1 31 9.9	1 30 56.8	1 30 43.7	1 30 30.6	1 30 17.5	+1.33	−1.31
40 10	1 31 36.4	1 31 23.3	1 31 10.2	1 30 57.0	1 30 43.9	1 30 30.8	1.34	1.31
40 20	1 31 49.9	1 31 36.8	1 31 23.7	1 31 10.5	1 30 57.4	1 30 44.3	1.35	1.31
40 30	1 32 3.6	1 31 50.4	1 31 37.3	1 31 24.1	1 31 11.0	1 30 57.8	1.36	1.32
40 40	1 32 17.4	1 32 4.2	1 31 51.0	1 31 37.9	1 31 24.7	1 31 11.5	1.37	1.32
40 50	1 32 31.3	1 32 18.1	1 32 4.8	1 31 51.7	1 31 38.4	1 31 25.2	+1.38	−1.32
41 0	1 32 45.3	1 32 32.1	1 32 18.8	1 32 5.6	1 31 52.3	1 31 39.1	1.39	1.33
41 10	1 32 59.4	1 32 46.2	1 32 32.9	1 32 19.6	1 32 6.3	1 31 53.0	1.40	1.33
41 20	1 33 13.7	1 33 0.4	1 32 47.0	1 32 33.7	1 32 20.4	1 32 7.1	1.42	1.33
41 30	1 33 28.1	1 33 14.8	1 33 1.4	1 32 48.0	1 32 34.6	1 32 21.3	1.43	1.34
41 40	1 33 42.6	1 33 29.2	1 33 15.8	1 33 2.4	1 32 49.0	1 32 35.6	+1.44	−1.34
41 50	1 33 57.2	1 33 43.8	1 33 30.4	1 33 17.0	1 33 3.5	1 32 50.0	1.45	1.34
42 0	1 34 12.0	1 33 58.5	1 33 45.0	1 33 31.6	1 33 18.1	1 33 4.6	1.47	1.35
42 10	1 34 26.9	1 34 13.4	1 33 59.8	1 33 46.4	1 33 32.8	1 33 19.3	1.48	1.35
42 20	1 34 41.9	1 34 28.4	1 34 14.8	1 34 1.3	1 33 47.7	1 33 34.2	1.50	1.35
42 30	1 34 57.0	1 34 43.5	1 34 29.9	1 34 16.3	1 34 2.7	1 33 49.1	+1.51	−1.36
42 40	1 35 12.3	1 34 58.7	1 34 45.0	1 34 31.4	1 34 17.8	1 34 4.2	1.52	1.36
42 50	1 35 27.7	1 35 14.0	1 35 0.3	1 34 46.7	1 34 33.0	1 34 19.4	1.54	1.36
43 0	1 35 43.2	1 35 29.5	1 35 15.8	1 35 2.1	1 34 48.4	1 34 34.7	1.55	1.37
43 10	1 35 58.8	1 35 45.1	1 35 31.4	1 35 17.6	1 35 3.9	1 34 50.1	1.56	1.37
43 20	1 36 14.6	1 36 0.8	1 35 47.1	1 35 33.3	1 35 19.5	1 35 5.7	+1.57	−1.38
43 30	1 36 30.5	1 36 16.7	1 36 2.9	1 35 49.1	1 35 35.3	1 35 21.5	1.58	1.38
43 40	1 36 46.6	1 36 32.8	1 36 18.9	1 36 5.1	1 35 51.2	1 35 37.4	1.60	1.38
43 50	1 37 2.8	1 36 49.0	1 36 35.0	1 36 21.1	1 36 7.2	1 35 53.3	1.61	1.39
44 0	1 37 19.1	1 37 5.2	1 36 51.3	1 36 37.3	1 36 23.4	1 36 9.4	1.62	1.39
44 10	1 37 35.6	1 37 21.6	1 37 7.7	1 36 53.7	1 36 39.7	1 36 25.7	+1.63	−1.40
44 20	1 37 52.2	1 37 38.2	1 37 24.2	1 37 10.2	1 36 56.2	1 36 42.2	1.65	1.40
44 30	1 38 8.9	1 37 54.9	1 37 40.9	1 37 26.8	1 37 12.8	1 36 58.8	1.66	1.40
44 40	1 38 25.8	1 38 11.7	1 37 57.7	1 37 43.6	1 37 29.6	1 37 15.5	1.68	1.41
44 50	1 38 42.9	1 38 28.8	1 38 14.7	1 38 0.6	1 37 46.5	1 37 32.4	1.70	1.41
45 0	1 39 0.1	1 38 46.0	1 38 31.9	1 38 17.7	1 38 3.6	1 37 49.5	+1.72	−1.42
45 10	1 39 17.5	1 39 3.3	1 38 49.2	1 38 35.0	1 38 20.8	1 38 6.7	1.73	1.42
45 20	1 39 35.0	1 39 20.7	1 39 6.6	1 38 52.4	1 38 38.1	1 38 23.9	1.75	1.42
45 30	1 39 52.7	1 39 38.4	1 39 24.1	1 39 9.9	1 38 55.6	1 38 41.3	1.76	1.43
45 40	1 40 10.5	1 39 56.2	1 39 41.8	1 39 27.5	1 39 13.2	1 38 58.9	1.78	1.43
45 50	1 40 28.5	1 40 14.1	1 39 59.7	1 39 45.4	1 39 31.0	1 39 16.7	+1.80	−1.44
46 0	1 40 46.6	1 40 32.2	1 40 17.8	1 40 3.4	1 39 49.0	1 39 34.6	1.82	1.44
46 10	1 41 4.9	1 40 50.5	1 40 36.0	1 40 21.6	1 40 7.1	1 39 52.7	1.83	1.44
46 20	1 41 23.4	1 41 8.9	1 40 54.4	1 40 39.9	1 40 25.4	1 40 10.9	1.85	1.45
46 30	1 41 42.0	1 41 27.5	1 41 13.0	1 40 58.4	1 40 43.9	1 40 29.3	1.87	1.45
46 40	1 42 0.8	1 41 46.3	1 41 31.7	1 41 17.1	1 41 2.5	1 40 47.9	+1.88	−1.46
46 50	1 42 19.8	1 42 5.2	1 41 50.5	1 41 36.0	1 41 21.3	1 41 6.7	1.90	1.46
47 0	1 42 38.9	1 42 24.2	1 42 9.5	1 41 54.9	1 41 40.2	1 41 25.6	1.91	1.47
47 10	1 42 58.2	1 42 43.4	1 42 28.7	1 42 14.0	1 41 59.3	1 41 44.6	1.93	1.47
47 20	1 43 17.6	1 43 2.8	1 42 48.1	1 42 33.3	1 42 18.6	1 42 3.9	1.95	1.48
47 30	*1 43 37.3*	1 43 22.4	1 43 7.7	1 42 52.9	1 42 38.1	1 42 23.3	+1.96	−1.48

TABLE VI.

AZIMUTH OF POLARIS AT ELONGATION, 1912.

Decl. / Lat.	88° 50′ 0″	88° 50′ 10″	88° 50′ 20″	88° 50′ 30″	88° 50′ 40″	88° 50′ 50″	Variation for—	
							1′ of Lat.	1″ of δ.
° ′	° ′ ″	° ′ ″	° ′ ″	° ′ ″	° ′ ″	° ′ ″	″	″
47 30	1 43 37.3	1 43 22.4	1 43 7.7	1 42 52.9	1 42 38.1	1 42 23.3	+1.96	−1.48
47 40	1 43 57.1	1 43 42.2	1 43 27.4	1 43 12.5	1 42 57.7	1 42 42.9	1.98	1.49
47 50	1 44 17.1	1 44 2.2	1 43 47.3	1 43 32.4	1 43 17.5	1 43 2.6	2.00	1.49
48 0	1 44 37.3	1 44 22.4	1 44 7.4	1 43 52.5	1 43 37.5	1 43 22.6	2.02	1.50
48 10	1 44 57.7	1 44 42.7	1 44 27.7	1 44 12.7	1 43 57.7	1 43 42.7	2.04	1.50
48 20	1 45 18.3	1 45 3.2	1 44 48.2	1 44 33.1	1 44 18.1	1 44 3.0	+2.06	−1.51
48 30	1 45 39.1	1 45 24.0	1 45 8.9	1 44 53.8	1 44 38.7	1 44 23.6	2.07	1.51
48 40	1 46 0.0	1 45 44.9	1 45 29.7	1 45 14.6	1 44 59.5	1 44 44.4	2.09	1.52
48 50	1 46 21.1	1 46 5.9	1 45 50.7	1 45 35.6	1 45 20.4	1 45 5.3	2.11	1.52
49 0	1 46 42.4	1 46 27.1	1 46 11.9	1 45 56.7	1 45 41.5	1 45 26.3	2.13	1.53
49 10	1 47 3.9	1 46 48.6	1 46 33.3	1 46 18.1	1 46 2.8	1 45 47.5	+2.15	−1.53
49 20	1 47 25.7	1 47 10.3	1 46 55.0	1 46 39.6	1 46 24.3	1 46 9.0	2.17	1.54
49 30	1 47 47.7	1 47 32.3	1 47 16.9	1 47 1.4	1 46 46.0	1 46 30.6	2.19	1.54
49 40	1 48 9.8	1 47 54.4	1 47 38.9	1 47 23.4	1 47 7.9	1 46 52.4	2.21	1.55
49 50	1 48 32.2	1 48 16.7	1 48 1.1	1 47 45.6	1 47 30.0	1 47 14.5	2.23	1.55
50 0	1 48 54.7	1 48 39.2	1 48 23.6	1 48 8.0	1 47 52.4	1 47 36.8	+2.25	−1.56
50 10	1 49 17.5	1 49 1.9	1 48 46.2	1 48 30.6	1 48 14.9	1 47 59.3	2.27	1.56
50 20	1 49 40.5	1 49 24.9	1 49 9.1	1 48 53.4	1 48 37.7	1 48 22.0	2.30	1.57
50 30	1 50 3.7	1 49 48.0	1 49 32.2	1 49 16.4	1 49 0.7	1 48 45.0	2.32	1.57
50 40	1 50 27.1	1 50 11.3	1 49 55.5	1 49 39.7	1 49 23.9	1 49 8.1	2.34	1.58
50 50	1 50 50.7	1 50 34.9	1 50 19.0	1 50 3.2	1 49 47.3	1 49 31.5	+2.36	−1.58
51 0	1 51 14.6	1 50 58.7	1 50 42.8	1 50 26.9	1 50 10.9	1 49 55.0	2.38	1.59
51 10	1 51 38.7	1 51 22.7	1 51 6.8	1 50 50.8	1 50 34.8	1 50 18.8	2.40	1.60
51 20	1 52 3.0	1 51 47.0	1 51 31.0	1 51 15.0	1 50 58.9	1 50 42.9	2.42	1.60
51 30	1 52 27.6	1 52 11.5	1 51 55.4	1 51 39.4	1 51 23.2	1 51 7.2	2.45	1.61
51 40	1 52 52.4	1 52 36.2	1 52 20.1	1 52 4.0	1 51 47.8	1 51 31.7	+2.47	−1.61
51 50	1 53 17.4	1 53 1.2	1 52 45.0	1 52 28.8	1 52 12.6	1 51 56.5	2.50	1.62
52 0	1 53 42.7	1 53 26.5	1 53 10.2	1 52 53.9	1 52 37.7	1 52 21.5	2.52	1.62
52 10	1 54 8.2	1 53 51.9	1 53 35.6	1 53 19.3	1 53 3.0	1 52 46.7	2.54	1.63
52 20	1 54 34.0	1 54 17.6	1 54 1.2	1 53 44.9	1 53 28.5	1 53 12.1	2.57	1.64
52 30	1 55 0.1	1 54 43.6	1 54 27.2	1 54 10.8	1 53 54.3	1 53 37.9	+2.60	−1.64
52 40	1 55 26.4	1 55 9.9	1 54 53.4	1 54 36.9	1 54 20.4	1 54 3.9	2.62	1.65
52 50	1 55 53.0	1 55 36.5	1 55 19.9	1 55 3.3	1 54 46.7	1 54 30.1	2.65	1.66
53 0	1 56 19.8	1 56 3.2	1 55 46.6	1 55 30.0	1 55 13.3	1 54 56.6	2.67	1.66
53 10	1 56 46.9	1 56 30.2	1 56 13.5	1 55 56.9	1 55 40.1	1 55 23.4	2.70	1.67
53 20	1 57 14.2	1 56 57.5	1 56 40.7	1 56 24.0	1 56 7.2	1 55 50.4	+2.73	−1.68
53 30	1 57 41.8	1 57 25.0	1 57 8.2	1 56 51.4	1 56 34.6	1 56 17.7	2.75	1.68
53 40	1 58 9.7	1 57 52.8	1 57 36.0	1 57 19.1	1 57 2.2	1 56 45.3	2.78	1.69
53 50	1 58 37.9	1 58 21.0	1 58 4.0	1 57 47.0	1 57 30.1	1 57 13.1	2.81	1.70
54 0	1 59 6.4	1 58 49.4	1 58 32.3	1 58 15.2	1 57 58.3	1 57 41.3	2.84	1.70
54 10	1 59 35.1	1 59 18.0	1 59 0.9	1 58 43.8	1 58 26.8	1 58 9.7	+2.87	−1.71
54 20	2 0 4.2	1 59 47.0	1 59 29.9	1 59 12.7	1 58 55.6	1 58 38.4	2.90	1.72
54 30	2 0 33.5	2 0 16.3	1 59 59.1	1 59 41.9	1 59 24.7	1 59 7.5	2.93	1.72
54 40	2 1 3.2	2 0 45.9	2 0 28.6	2 0 11.4	1 59 54.1	1 59 36.8	2.96	1.73
54 50	2 1 33.2	2 1 15.8	2 0 58.5	2 0 41.1	2 0 23.8	2 0 6.4	3.00	1.74
55 0	2 2 3.5	2 1 46.0	2 1 28.6	2 1 11.2	2 0 53.8	2 0 36.4	+3.03	−1.74
55 10	2 2 34.1	2 2 16.6	2 1 59.1	2 1 41.6	2 1 24.1	2 1 6.6	3.06	1.75
55 20	2 3 5.0	2 2 47.4	2 2 29.8	2 2 12.3	2 1 54.7	2 1 37.1	3.09	1.76
55 30	2 3 36.3	2 3 18.6	2 3 0.9	2 2 43.3	2 2 25.6	2 2 8.0	3.12	1.76
55 40	2 4 7.8	2 3 50.1	2 3 32.3	2 3 14.6	2 2 56.9	2 2 39.2	3.15	1.77
55 50	2 4 39.7	2 4 21.9	2 4 4.1	2 3 46.3	2 3 28.5	2 3 10.7	+3.18	−1.78
56 0	2 5 11.9	2 4 54.0	2 4 36.2	2 4 18.3	2 4 0.4	2 3 42.5	3.22	1.79
56 10	2 5 44.5	2 5 26.5	2 5 8.6	2 4 50.6	2 4 32.7	2 4 14.7	3.25	1.80
56 20	2 6 17.4	2 5 59.4	2 5 41.4	2 5 23.3	2 5 5.3	2 4 47.3	3.28	1.80
56 30	2 6 50.7	2 6 32.6	2 6 14.5	2 5 56.4	2 5 38.3	2 5 20.2	3.32	1.81
56 40	2 7 24.4	2 7 6.2	2 6 48.0	2 6 29.8	2 6 11.6	2 5 53.4	+3.35	−1.82
56 50	2 7 58.5	2 7 40.2	2 7 21.9	2 7 3.6	2 6 45.3	2 6 27.0	3.39	1.83
57 0	2 8 32.9	2 8 14.5	2 7 56.1	2 7 37.7	2 7 19.3	2 7 1.0	3.43	1.83
57 10	2 9 7.6	2 8 49.1	2 8 30.7	2 8 12.2	2 7 53.7	2 7 35.3	3.46	1.84
57 20	2 9 42.7	2 9 24.1	2 9 5.7	2 8 47.1	2 8 28.5	2 8 10.0	3.50	1.85
57 30	2 10 18.3	2 9 59.7	2 9 41.1	2 9 22.4	2 9 3.7	2 8 45.1	+3.53	−1.86

TABLE VI.

AZIMUTH OF POLARIS AT ELONGATION, 1912.

Decl. / Lat.	88° 50′ 0″	88° 50′ 10″	88° 50′ 20″	88° 50′ 30″	88° 50′ 40″	88° 50′ 50″	Variation for— 1′ of Lat.	Variation for— 1″ of δ.
° ′	° ′ ″	° ′ ″	° ′ ″	° ′ ″	° ′ ″	° ′ ″	″	″
57 30	2 10 18.3	2 9 59.7	2 9 41.1	2 9 22.4	2 9 3.7	2 8 45.1	+3.53	−1.86
57 40	2 10 54.2	2 10 35.5	2 10 16.8	2 9 58.0	2 9 39.3	2 9 20.6	3.57	1.87
57 50	2 11 30.5	2 11 11.7	2 10 52.9	2 10 34.1	2 10 15.3	2 9 56.5	3.61	1.88
58 0	2 12 7.2	2 11 48.3	2 11 29.4	2 11 10.5	2 10 51.6	2 10 32.7	3.65	1.89
58 10	2 12 44.3	2 12 25.4	2 12 6.4	2 11 47.4	2 11 28.4	2 11 9.4	3.70	1.90
58 20	2 13 21.9	2 13 2.8	2 12 43.8	2 12 24.7	2 12 5.6	2 11 46.5	+3.75	−1.91
58 30	2 13 59.9	2 13 40.7	2 13 21.5	2 13 2.4	2 12 43.2	2 12 24.0	3.80	1.92
58 40	2 14 38.2	2 14 18.9	2 13 59.7	2 13 40.5	2 13 21.2	2 13 2.0	3.84	1.93
58 50	2 15 17.0	2 14 57.6	2 14 38.4	2 14 19.0	2 13 59.7	2 13 40.4	3.89	1.94
59 0	2 15 56.3	2 15 36.8	2 15 17.5	2 14 58.0	2 14 38.6	2 14 19.2	3.93	1.95
59 10	2 16 36.0	2 16 16.5	2 15 57.0	2 15 37.4	2 15 17.9	2 14 58.4	+3.98	−1.96
59 20	2 17 16.2	2 16 56.6	2 16 37.0	2 16 17.3	2 15 57.7	2 15 38.1	4.02	1.97
59 30	2 17 56.9	2 17 37.2	2 17 17.5	2 16 57.7	2 16 38.0	2 16 18.3	4.07	1.98
59 40	2 18 38.0	2 18 18.2	2 17 58.4	2 17 38.6	2 17 18.7	2 16 58.9	4.11	1.99
59 50	2 19 19.6	2 18 59.7	2 18 39.8	2 18 19.9	2 18 0.0	2 17 40.1	4.16	2.00
60 0	2 20 1.7	2 19 41.7	2 19 21.7	2 19 1.7	2 18 41.7	2 18 21.7	+4.20	−2.01

TABLE VIa.

FOR REDUCING TO ELONGATION, OBSERVATIONS MADE NEAR ELONGATION, 1912.

Azimuth. / *Time.	1° 10′	1° 20′	1° 30′	1° 40′	1° 50′	2° 0′	2° 10′	2° 20′	Azimuth. / Time.*
m	″	″	″	″	″	″	″	″	m
0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0
1	+ 0.1	+ 0.1	+ 0.1	+ 0.1	+ 0.1	+ 0.1	+ 0.1	+ 0.2	1
2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	2
3	0.4	0.4	0.4	0.5	0.6	0.6	0.7	0.7	3
4	0.6	0.7	0.8	0.9	1.0	1.1	1.2	1.3	4
5	+ 1.0	+ 1.1	+ 1.3	+ 1.4	+ 1.6	+ 1.7	+ 1.9	+ 2.0	5
6	1.4	1.6	1.8	2.1	2.3	2.5	2.7	2.9	6
7	2.0	2.2	2.5	2.8	3.1	3.4	3.7	3.9	7
8	2.6	2.9	3.3	3.7	4.0	4.4	4.8	5.1	8
9	3.3	3.7	4.2	4.7	5.1	5.5	6.0	6.5	9
10	+ 4.0	+ 4.6	+ 5.1	+ 5.7	+ 6.3	+ 6.8	+ 7.4	+ 8.0	10
11	4.9	5.6	6.2	6.9	7.6	8.3	9.0	9.7	11
12	5.8	6.6	7.4	8.2	9.0	9.9	10.7	11.5	12
13	6.8	7.8	8.7	9.7	10.6	11.6	12.5	13.5	13
14	7.8	9.0	10.1	11.2	12.3	13.4	14.5	15.7	14
15	+ 9.0	+10.3	+11.6	+12.9	+14.1	+15.4	+16.7	+18.0	15
16	10.2	11.7	13.2	14.6	16.1	17.5	19.0	20.4	16
17	11.5	13.2	14.9	16.4	18.2	19.8	21.4	23.0	17
18	12.9	14.8	16.7	18.5	20.4	22.2	24.0	25.9	18
19	14.4	16.5	18.6	20.7	22.7	24.7	26.8	28.9	19
20	+16.0	+18.3	+20.6	+22.9	+25.1	+27.4	+29.7	+32.0	20
21	17.7	20.2	22.7	25.2	27.7	30.2	32.7	35.3	21
22	19.4	22.1	24.9	27.6	30.4	33.2	35.9	38.7	22
23	21.2	24.2	27.2	30.2	33.2	36.3	39.2	42.3	23
24	23.0	26.3	29.6	32.9	36.2	39.4	42.7	46.0	24
25	+25.0	+28.6	+32.1	+35.7	+39.3	+42.7	+46.3	+49.9	25
26	27.0	30.9	34.7	38.6	42.4	46.3	50.1	54.0	26
27	29.1	33.3	37.5	41.6	45.7	50.0	54.0	58.2	27
28	31.3	35.8	40.3	44.7	49.2	53.7	58.1	62.6	28
29	33.6	38.4	43.2	48.0	52.8	57.6	62.3	67.1	29
30	+35.9	+41.1	+46.2	+51.4	+56.5	+61.6	+66.7	+71.8	30

* *Sidereal time from elongation.*

FOR FINDING THE TIMES OF UPPER AND LOWER CULMINATION OF POLARIS FROM THE OBSERVED TIMES WHEN THE STAR IS ON THE SAME VERTICAL CIRCLE WITH THE STARS ζ URSÆ MAJORIS (MIZAR) *SUB. POLO.* AND δ CASSIOPEIÆ *SUB. POLO.*, RESPECTIVELY.

Except at high latitudes, the pole star at either upper or lower culmination furnishes a simple and convenient method for laying down a meridian line on the earth's surface at points in the northern hemisphere. When the local time is unknown and accurate astronomical instruments are not available, the time of culmination of Polaris may be found by observing the instant when Polaris is vertically above (has the same azimuth as) ζ Ursæ Majoris (Mizar) below the pole, or δ Cassiopeiæ below the pole. In the former case, for the year 1912, Polaris is approaching upper culmination and in the latter case it is approaching lower culmination. The mean time interval which elapses between the observed times above mentioned and upper or lower culmination, as the case may be, are given for ζ Ursæ Majoris and δ Cassiopeiæ for ten-day intervals in the following table. This method can not be used at places south of 30° north latitude.

TABLE VII.

MEAN TIME INTERVAL.

ζ URSÆ MAJORIS (MIZAR). (Upper culmination of Polaris.)							δ CASSIOPEIÆ. (Lower culmination of Polaris.)						
1912	Lat.	40°	45°	50°	55°	60°	1912	Lat.	35°	40°	45°	50°	55°
		m s	m s	m s	m s	m s			m s	m s	m s	m s	m s
Jan.	1	6 54	6 53	6 51	6 49	6 47	Jan.	1	7 58	7 59	8 1	8 3	8 5
	11	6 44	6 43	6 41	6 39	6 37		11	7 47	7 49	7 50	7 52	7 54
	21	6 34	6 33	6 31	6 29	6 27		21	7 36	7 38	7 39	7 41	7 43
July	10	6 47	6 46	6 44	6 42	6 40		31	7 26	7 27	7 28	7 30	7 32
	20	6 57	6 56	6 54	6 52	6 50	Feb.	10	7 16	7 16	7 17	7 19	7 21
	30	7 9	7 7	7 5	7 3	7 1		20	7 6	7 7	7 8	7 10	7 12
Aug.	9	7 19	7 18	7 16	7 14	7 11	Mar.	2	6 57	6 58	6 59	7 1	7 3
	19	7 28	7 27	7 25	7 23	7 20		12	6 52	6 53	6 54	6 56	6 58
	29	7 35	7 34	7 32	7 30	7 27		22	6 47	6 48	6 49	6 51	6 53
Sept.	8	7 42	7 40	7 38	7 36	7 33	Apr.	1	6 44	6 45	6 46	6 48	6 49
	18	7 50	7 48	7 46	7 44	7 41		11	6 44	6 45	6 46	6 48	6 49
	28	7 54	7 52	7 50	7 48	7 45		21	6 46	6 46	6 47	6 49	6 51
Oct.	8	7 56	7 55	7 53	7 51	7 48	May	1	6 49	6 50	6 51	6 53	6 55
	18	7 58	7 57	7 55	7 53	7 50		11	6 54	6 55	6 57	6 58	7 0
	28	7 57	7 56	7 54	7 52	7 49		21	7 1	7 2	7 4	7 5	7 7
Nov.	7	7 55	7 54	7 52	7 50	7 47		31	7 10	7 11	7 12	7 14	7 16
	17	7 53	7 51	7 49	7 47	7 44	June	10	7 19	7 20	7 21	7 23	7 25
	27	7 48	7 47	7 45	7 43	7 40		20	7 29	7 30	7 31	7 33	7 35
Dec.	7	7 40	7 39	7 37	7 35	7 32		30	7 40	7 41	7 43	7 45	7 47
	17	7 33	7 31	7 29	7 27	7 24	July	10	7 50	7 52	7 54	7 56	7 58
	27	7 24	7 23	7 21	7 19	7 16		20	8 1	8 2	8 4	8 6	8 8
	37	7 15	7 14	7 12	7 10	7 7		30	8 12	8 13	8 15	8 17	8

[Eph 12]

ON THE ARRANGEMENT AND USE OF THE AMERICAN EPHEMERIS AND NAUTICAL ALMANAC.

The first part of this Ephemeris, embracing the positions of the Sun and Moon, together with the ephemerides of the planets Mercury, Venus, Mars, Jupiter, and Saturn, is designed for the special use of navigators. The remainder of the work is intended to meet the wants of astronomers. It contains the ephemerides of Uranus and Neptune, the heliocentric co-ordinates of the seven major planets, the rectangular equatorial coordinates of the Sun, the Moon's longitude and latitude, data for the libration of the Moon, the obliquity of the ecliptic, the nutation, the positions of 825 standard stars, the ephemeris for the meridian of Washington, etc.

TIME.

Astronomers make use of three different kinds of time, namely: First, true or apparent solar time; second, mean solar time; third, sidereal time.

True or Apparent Solar Time.—This species of time is called indiscriminately either true solar time or apparent solar time, and is measured by the motion of the true Sun; the length of the day being the interval between two successive transits of the Sun over the same meridian, and the time of day being always the hour angle of the Sun from the meridian. This is the most obvious and natural measure of time, but, owing to the obliquity of the ecliptic and the varying motion of the Earth in its orbit, the intervals between successive returns of the Sun to the same meridian are not exactly equal, and consequently ordinary clocks and chronometers can not be regulated to true solar time.

Mean Solar Time.—To avoid the irregularity which would arise from using the true solar day, astronomers have recourse to a mean solar day, whose length is equal to the average of all the true solar days in a year. Just as the true solar day depends upon the motion of the true Sun, so the mean solar day is made to depend upon the motion of an imaginary mean Sun which moves along the equator at a perfectly uniform rate, and whose hour angle from any given meridian is always the mean solar time thereat. Ordinary clocks and watches and the chronometers used by navigators are regulated to this species of time.

Equation of Time.—The imaginary mean Sun is supposed to keep as near the true Sun as is consistent with perfect uniformity of motion, but it is sometimes before and sometimes behind the latter, the greatest difference amounting to rather more than one-quarter of an hour. The interval between the true Sun and the imaginary mean Sun is the equation of time, given on pages I and II of the Ephemeris for the meridian of Greenwich, and a knowledge of it is necessary for converting true solar time into mean solar time, or *vice versa.* As the mean Sun is an imaginary body, mean solar time can not be directly observed, but it can be *got either from* observations of the true Sun by applying to them the

rection for the equation of time, or from observations of the stars by m
the sidereal time of mean noon, given on page II of the Ephemeris for
ridian of Greenwich.

Sidereal Time.—Sidereal time is measured, roughly speaking, by the d
otion of the stars; or in strict accuracy by the daily motion of that point in
ator from which the true right ascensions of the stars are counted. The p
question is the vernal equinox, and its hour angle is always the sidereal ti
stronomical clocks are usually regulated to sidereal time, and are then ca
ereal clocks.

Sidereal Day.—A sidereal day is the interval between two successive tran
the vernal equinox over the same meridian. It is 3^m 55^s.909 of mean s
me shorter than the mean solar day, the tropical year of 365.2422 solar d
eing divided into 366.2422 sidereal days, each comprising 24 sidereal hours.
sidereal hours are counted from 0 to 24, commencing with the instant of the
e of the true vernal equinox over the upper meridian, and ending with
urn to the same meridian. About March 23 of each year the sidereal cl
grees with the mean-time or ordinary clock, and the former gains on the la
3^m 56^s.555 of sidereal time per day, so that at the end of a year it will have gai
entire day, and will again agree with the mean-time clock.

Civil Day.—According to the customs of society, the civil day commence
midnight, and comprises twenty-four hours, which extend to the next follo
midnight. The hours are counted from 0 to 12 in two series; the first, ma
A. M., running from midnight to noon, and the second, marked P. M., run
from noon to midnight.

Astronomical Day.—The astronomical day begins at noon on the civil da
the same date. It also comprises twenty-four hours, but they are reckoned
0 to 24, and run from the noon of one day to that of the next following. A
nomical time as well as civil time may be either apparent or mean, accordin
it is reckoned from apparent noon or from mean noon.

The civil day begins twelve hours before the astronomical day; therefore
first half of the civil day corresponds to the last half of the preceding astrono
day, and the last half of the civil day coincides with the first half of the a
nomical day of the same date. Thus, January 9, 2 o'clock, A. M., civil tim
January 8, 14^h, astronomical time; and January 9, 2 o'clock, P. M., civil tim
also January 9, 2^h, astronomical time. Hence, we have the following rules:

To convert Civil Time into Astronomical Time.—If the civil time is ma
A. M., take one from the day and add twelve to the hours, and the result wi
the corresponding astronomical time; if the civil time is marked P. M., take a
the designation P. M., and the astronomical time will result.

To convert Astronomical Time into Civil Time.—If the astronomical ti
less than twelve hours, simply write P. M. after it. If greater than twelve h
subtract twelve hours from it, mark the result A. M., and add one to the
For example, October 3, 23 hours, astronomical time, is October 4, 11 o'cl
A. M., civil time.

To find Greenwich Time.—Express the longitude from Greenwich in time,
when west, add it to the local time, or when east, subtract it from the local t
The result will be the corresponding Greenwich time; mean or sidereal, accor
as the local time employed is mean or sidereal. For use with Part I of this Ep
eris, Greenwich mean time is ordinarily required.

PART I.—THE EPHEMERIS FOR THE MERIDIAN OF GREENWICH.

Pages 2–145 give data arranged under the heads of the several months, and are therefore designated as the Calendar. Each month covers 12 pages, numbered from I to XII, whose contents are as follows:

Page I contains, for Greenwich apparent noon of each day, *The Sun's Apparent Right Ascension* and *Declination*, and the *Equation of Time*. Adjoining columns contain the differences of these quantities for one hour. By multiplying any one of these differences by the hours and parts of an hour from Greenwich apparent noon, and adding the product to, or subtracting it from, the corresponding quantity at noon, according as that quantity is increasing or decreasing, we obtain the value of the quantity in question for any given Greenwich apparent time. The hourly differences are given for the instant of apparent noon at Greenwich, but when great accuracy is required they should be interpolated for half the hours and parts of an hour of the Greenwich apparent time.

The *Equation of Time* given on page I is the mean time of apparent noon, or the hour angle of the mean Sun at that instant. The heading of the column directs how the equation is to be applied to apparent time, or the time given by an observation of the Sun, in order to get mean time. When in the course of the month there is a change from addition to subtraction or the reverse (as in the months of April and June), the two different directions are separated by a line, while a corresponding line below points out the dates between which the change occurs.

The Sun's Semidiameter and the *Sidereal Time of Semidiameter Passing Meridian* are also given on page I. The semidiameter is used in reducing the altitude of the upper or lower limb of the Sun to the altitude of the center; and in reducing the angular distance between the limb of the Sun and any other object, to the distance from the center of the Sun. The sidereal time of semidiameter passing the meridian is employed in obtaining the passage of the Sun's center over the wires of a transit instrument, when the passage of one limb only has been observed. The quantity found in this column is to be added to the time of transit of the first, or western, limb; and to be subtracted from the time of transit of the second, or eastern, limb.

This page is chiefly used when the Sun is observed on the meridian, at which instant the local apparent time is $0^h\ 0^m\ 0^s$. The longitude from Greenwich expressed in time is then the corresponding Greenwich apparent time, before or after noon according as the longitude is east or west. The longitude of any place is therefore the factor employed in reducing the quantities on this page to apparent noon at that place.

The right ascension of the Sun thus reduced is the sidereal time of local apparent noon, and the difference between that and the clock time of the meridian passage of the Sun is the error of the clock on sidereal time.

The declination of the Sun reduced to the meridian, or apparent noon, of the place, is required in finding the latitude from a meridian altitude of the Sun.

As an example of the use of page I:—

Let the Sun's declination be required at apparent noon, 1912, April 15, at a place whose longitude is 89° 40′, or $5^h\ 58^m\ 40^s$ west from Greenwich:—

		h	m	s
Local apparent time . . .	April 15,	0	0	0
Longitude from Greenwich (additive) . .		5	58	40
Greenwich apparent time . . .	April 15,	5	58	40

Reducing the minutes and seconds to decimals of an hour, we find that this moment is 5^h.978 after Greenwich apparent noon on April 15, or 18^h.022 before Greenwich apparent noon on April 16.

On page 38 of the Ephemeris we find that the change of declination in one hour is:

	″
April 15, at Greenwich apparent noon . . .	**+53.65**
April 16, at Greenwich apparent noon . . .	**+53.24**
Difference for one day	**− 0.41**

If great exactness is desired, we find the amount of this hourly difference for the time which is halfway between Greenwich noon and the time of observation; that is, for 3 hours after Greenwich noon of the 15th, this being half of 6 hours. Three hours is 0.125 of a day; so the calculation is as follows:

	″
Difference for one hour, April 15 . .	**+53.65**
Change for 0.125 of a day or − 0″.41×0.125 .	**− 0.05**
Difference at 3 hours after noon . . .	**+53.60**
53″.60×5.978=320″.4=5′ 20″.4	
	° ′ ″
Declination at Greenwich noon, April 15 .	**N. 9 44 12.2**
Change in 5.978 hours (additive) . . .	**5 20.4**
Sun's declination at time of observation . .	**N. 9 49 32.6**

When the time of observation is only a few hours before Greenwich noon, it may be better to count the longitude backward from this nearest noon. Thus, in the example just given the time is 18^h.022 before Greenwich noon of April 16; half this interval is about 0.375 of a day, and the hourly motion for the middle of the interval is 53″.39. Then, we find—

	° ′ ″
Declination at Greenwich noon, April 16 .	N. 10 5 35.0
Product of 53″.39×18.022=962″.2 (subtractive)	— 16 2.2
Sun's declination at time of observation . .	N. 9 49 32.8

It will always be well to make the calculation in both ways, as a check; but if the results differ slightly, the one derived from the nearest noon should be regarded as the more accurate. At sea, however, it is ordinarily sufficient to compute the declination to the nearest half minute, and the reduction may then be found by Table 12 of BOWDITCH'S *American Practical Navigator.*

Page II contains, for Greenwich mean noon of each day, *The Sun's Apparent Right Ascension* and *Declination*, the *Equation of Time*, and the *Sidereal Time of Mean Noon.* The hourly changes of these quantities are also given, and may be used in reducing them for the longitude, or to any Greenwich mean time. When great precision is required, these changes should be interpolated for half the Greenwich time, as described in explaining the calculation of the declination.

The *Equation of Time* given on page II is the apparent time of mean noon, and is equivalent to the hour angle of the true Sun at the instant of mean noon. The heading of the column directs how the equation must be applied to mean time in order to obtain apparent time.

The *Sidereal Time of Mean Noon* is the right ascension of the mean Sun Greenwich mean noon. It may be reduced for the longitude, or to any Greenwic mean time, by using the hourly difference, $9^s.8565$; or by Table III appended to this volume, for reducing intervals of mean solar to sidereal time; or by Table 9 of BOWDITCH'S *Navigator*.

The right ascensions and declinations on pages I and II are affected both by aberration and nutation, and therefore denote the *apparent* positions of the *true* Sun. Page I is used for observations which depend upon apparent time, as when the Sun is observed on the meridian; while page II is used when the times have been noted by a clock or chronometer regulated to mean time, as is the case in most observations of the Sun out of the meridian.

The Sun's declination is required whenever that body is observed for the purpose of finding latitude, local time, or azimuth, and the equation of time is needed in finding the apparent time when determining the latitude from observations of the Sun out of the meridian.

The sidereal time of mean noon, or right ascension of the mean Sun, is useful in converting mean time to sidereal time. We first find the Greenwich mean time, then the right ascension of the mean Sun for that time, and this being added to the local astronomical mean time will give the sidereal time.

The sidereal time of mean noon, reduced for the longitude of the place, is also used in converting sidereal time to mean time. Subtracting the reduced value from the given sidereal time gives the interval of sidereal time from noon, and that is converted into the required mean time by subtracting from it the corresponding reduction of a sidereal interval to a mean-time interval, taken from Table II appended to this volume, or from Table 8 of BOWDITCH'S *Navigator*. Instead of using Table II, this reduction may be found by multiplying $9^s.8296$ by the hours and parts of an hour of the sidereal interval from noon.

As examples of the use of page II:—

1.—Let the Sun's right ascension and the equation of time be required for 1912, July 13, $10^h\ 3^m\ 30^s$, A. M., mean time, at a place whose longitude is 85° 15′, or $5^h\ 41^m\ 0^s$ west of Greenwich.

		h	m	s	
Local astronomical mean time . . .	July 12,	22	3	30	
Longitude from Greenwich (additive) . . .		5	41	0	
Greenwich mean time	July 13,	3	44	30	$= 3^h.7417$

Sun's Right Ascension.	h	m	s	*Equation of Time.*		m	s	
July 13, Greenwich noon	7	29	28.88	July 13, Greenwich noon		5	29.41	(subtractive)
H. D. $10^s.159 \times 3.7417$	+		38.01	H. D. $+0^s.303 \times 3.7417$.	+		1.13	
	7	30	6.89			5	30.54	

In this case the hourly differences interpolated to half the interval, or $1^h.87$ after noon, have been used. The equation of time is here subtractive from mean time. Its reduction could have been found by Table 12 of BOWDITCH'S *Navigator*.

2.—If the sidereal time is required for the same date and time, we have—

		h	m	s
July 13, sidereal time (at Greenwich mean noon) . .		7	23	59.47
Reduction for $3^h\ 44^m\ 30^s$ from Table III, or $9^s.8565 \times 3.7417$	+			36.88
Add the local astronomical mean time		22	3	30.00
The required sidereal time is (rejecting 24^h) . . .		5	28	6.35

The reduction $36^s.88$ can be found in Table III corresponding to the Greenwich mean time $3^h\ 44^m\ 30^s$, or by Table 9 of BOWDITCH'S *Navigator*.

5.—On 1912, July 13, A. M., at a place whose longitude is 85° 15′ W., suppose the sidereal time to be 5h 28m 6s.35, and that the corresponding mean time is required.

The astronomical day is July 12; the longitude in time, + 5h 41m 0s, or + 5h.683.

		h	m	s
July 12, sidereal time (at Greenwich mean noon)		7	20	2.91
Reduction for 5h 41m 0s from Table III, or 9s.8565 × 5.683		+		56.01
The sidereal time of local mean noon		7	20	58.92
The given sidereal time (+24h, if necessary for the following subtraction)		29	28	6.35
Subtracting the first from the second gives the sidereal interval from noon		22	7	7.43 = 22h.1187
Reduction for 22h 7m 7s.42 from Table II, or − 9s.8296 × 22.1187		−	3	37.42
The required astronomical mean time is	July 12,	22	3	30.01

Page III contains, for Greenwich mean noon of each day, *The Sun's True Longitude and Latitude*, and the *Logarithm of the Radius Vector of the Earth*. The longitudes of the Sun are the true geometric longitudes, not corrected for aberration. They are given in two columns, headed respectively λ and λ′; λ representing the Sun's longitude counted from the true equinox of the date; and λ′, the same coordinate counted from the mean equinox of the beginning of the Besselian fictitious year. The latitude is referred to the mean ecliptic of the date. Columns of hourly differences are given to facilitate finding the Sun's longitude, or the logarithm of the radius vector, for any hour from noon.

The last column on page III contains the *Mean Time of Sidereal Noon*, that is, the number of hours, minutes, and seconds after Greenwich mean noon when the vernal equinox passes the meridian of Greenwich. It may be reduced to any meridian, or to any Greenwich sidereal time, by using the hourly difference, — 9s.8296, to effect the necessary interpolation. The reduction, however, can be taken directly from Table II for reducing intervals of sidereal time to mean solar time, or from Table 8 of BOWDITCH'S *Navigator*.

This column may be used in converting sidereal time to mean time, instead of that on page II. As an illustration, let us take Example 3, above.

It is seen in advance that the sum of the mean time of sidereal noon and the given sidereal time is less than 24 hours. Were it more than 24 hours, the mean time of sidereal noon should be taken out for July 11; that is, the preceding astronomical day.

		h	m	s
July 12, the mean time of Greenwich sidereal noon is		16	37	13.27
Reduction for longitude from Table II, or −9s.8296 × 5.683				−55.86
The mean time of local sidereal noon		16	36	17.41
Add the given sidereal time		5	28	6.35 = 5h.4684
The sum is		22	4	23.76
Reduction for 5h 28m 6s.35 from Table II, or −9s.8296 × 5.4684				−53.75
The required astronomical mean time	July 12,	22	3	30.01

Page IV contains *The Moon's Semidiameter* and *Equatorial Horizontal Parallax* for each mean noon and midnight at Greenwich. Columns adjoining those of the horizontal parallax give the change of that quantity in one hour, by means of which it can be reduced to any other Greenwich mean time, in the same way as the Sun's declination and the equation of time in the preceding examples. The sign plus or minus is prefixed to the hourly differences, according as the horizontal parallax is increasing or decreasing.

The reduction of the Moon's semidiameter may be readily found by multiplying the reduction of the horizontal parallax by 0.273, or by simply computing the proportional part.

If, for example, the semidiameter of the Moon is to be taken out for 1912, March 10, 7^{h}, P. M., Greenwich mean time, we see that the difference of the semidiameters at noon and midnight of March 10 is 3″.4; then,

$$12^{h} : 7^{h} = 3''.4 : 2''.0$$

which is the correction to be subtracted from the semidiameter at noon, because the semidiameter is decreasing. The Moon's semidiameter for March 10, 7^{h}, is therefore 14′ 54″.7.

The Moon's semidiameter and horizontal parallax are required for all observations of the Moon. When great precision is needed, the hourly differences should be interpolated for half the interval of Greenwich time from noon or midnight, and the horizontal parallax should be corrected for the latitude of the place of observation.

The *Mean Time of The Moon's Upper Transit at Greenwich* and the *Age of the Moon* are also contained on page IV. The time of transit is given to tenths of a minute, and is accompanied by a column of differences for one hour of longitude, by means of which the local time of the Moon's meridian transit may be computed for any other place whose longitude is known. Table 11 of BOWDITCH's *Navigator* furnishes the necessary reduction by simple inspection. The age of the Moon, or the time elapsed since the preceding new Moon, is given to tenths of a day.

Pages V–XII contain *The Moon's Right Ascension* and *Declination* for each day and hour of Greenwich mean time. They are accompanied by columns of differences for one minute, which are also given at each hour. The Greenwich mean time, which is required for taking out these quantities, may either be taken from a well-regulated chronometer, or may be obtained by applying the longitude, converted into time, to the local mean time of the observer. The right ascension or declination is taken out for the given day and hour of Greenwich mean time; the *Diff. for 1 Minute* is multiplied by the minutes and parts of a minute of the Greenwich time, and the product is added to or subtracted from the quantity, according as the latter is increasing or decreasing.

Thus, suppose the Moon's right ascension and declination are required for 1912, April 27, $10^{h}\ 10^{m}\ 30^{s}$, astronomical mean time at Greenwich:—

Right Ascension.	h m s	*Declination.*	° ′ ″
April 27, 10^{h}	11 40 18.98		N. 4 49 34.1
Diff. 2.0361 × 10.5	21.38	−16.206 × 10.5	− 2 50.2
April 27, $10^{h}\ 10^{m}\ 30^{s}$	11 40 40.36		N. 4 46 43.9

For the sake of precision, the differences here employed have been interpolated for $5^{m}.2 = 0^{h}.09$.

Page XII contains also the *Phases of the Moon* and the dates of the *Moon's Perigee and Apogee*, or least and greatest distances from the Earth.

Pages 146–177 contain the geocentric ephemerides of the seven major planets. The places given are apparent positions; that is, they are referred to the equator and true equinox of the date, and are corrected for aberration. All the data except meridian passage are given for the instant of Greenwich mean noon. The column *Meridian Passage* shows the hour, minute, and tenth of that passage of the planet over the meridian of Greenwich which occurs next after the noon of the date.

The right ascension and declination of a planet are required whenever it is observed for time, latitude, or azimuth. The mode of reducing the ephemeris positions of planets to other instants of Greenwich mean time is the same as that given for the Sun on pages 687–690. The local mean time of meridian passage of any planet, at any place, can be found by dividing the proper daily difference of the ephemeris times by 24, multiplying the quotient by the longitude of the place expressed in hours and fractions, and applying the product with its proper sign to the time of Greenwich passage.

Pages 178–199 contain the heliocentric coordinates of the seven major planets, and the logarithms of their distances from the Earth. The heliocentric longitude is reckoned, not from the true equinox, as in the preceding ephemerides, but from the mean equinox of the date. It is, therefore, necessary to apply nutation, if the longitude from the true equinox is required. The daily motion is given for the instant of Greenwich mean noon. The column *Reduction to Orbit* contains the correction to be applied to the heliocentric longitude in order to obtain the longitude counted along the orbit of the planet. The latter is equal to the distance from the mean equinox to the node, plus the distance from the node to the planet. The heliocentric latitude is counted from the mean ecliptic of the date. The *Logarithm of Radius Vector* is the logarithm of the distance of the center of the planet from that of the Sun, at the Greenwich mean noon whose date is given in the first column. The last two columns give, respectively, the logarithm of the true distance of the center of the planet from that of the Earth, for the Greenwich noon indicated on the left-hand side of the page, and for the time which is midway between that date and the date next below it. In the case of Mercury, this intermediate date is mean midnight of the same day; in the case of Venus and Mars, it is the mean noon of the day immediately following; in the case of Jupiter and Saturn, it is mean noon of the second day following; and in the case of Uranus and Neptune, mean noon of the fourth day following.

Pages 200–207 contain the rectangular coordinates of the center of the Sun, referred to the center of the Earth as the origin, and to the true equator and equinox of each date as the plane and point of reference. Each coordinate is given both for Greenwich mean noon and for Greenwich mean midnight of the same day. The columns *Reduc. to Mean Eq'x of Jan. 0*, give the corrections to be applied to the coordinates for noon in order to obtain the corresponding coordinates referred to the mean equator and the mean equinox of the beginning of the Besselian fictitious year.

Pages 208–211 give for every Greenwich mean noon and midnight the apparent geocentric longitude and latitude of the Moon referred to the true ecliptic and equinox of the date.

Page 212 contains the position of the Moon's equator, the longitude of the Moon's perigee, the mean longitude of the Moon's ascending node, and the Moon's mean longitude.

Page 213 contains the elements of the libration of the Moon, and the Sun's aberration and horizontal parallax. The epochs of greatest libration of the Moon, together with the formulæ for finding the libration in longitude and latitude, are given on page 566. *The Sun's Aberration* is the quantity which is to be applied to the true longitude of the Sun in order to obtain its apparent longitude. The correction being negative shows that the apparent longitude as affected by aberration is always less than the true longitude. The *Sun's Equatorial Horizontal Parallax*, given in the last column, is the angle subtended by the equatorial radius of the Earth, as seen from the center of the Sun.

Pages 214, 231–232 give data for precession and the obliquity of the ecliptic, together with all sensible terms arising from the motions of the equator and ecliptic. To show clearly the relations of these quantities, let

λ = the longitude of any body referred to the true equinox of the date.

λ' = the longitude of the same body referred to the mean equinox of the beginning of the Besselian fictitious year.

ψ_1 = the adopted value of the general precession.

$\delta'\psi$ = the principal term of the nutation in longitude; or, in other words, the correction to be applied to the longitude of a body referred to the mean equinox of date, in order to obtain that longitude as referred to the true equinox, exclusive of short period terms. When the correction is positive, the longitudes referred to the true equinox are greater than those referred to the mean equinox; while the contrary is the case when the correction has a negative sign.

$\delta''\psi$ = the short period terms of nutation in longitude, given on pages 231–232.

ω = the true or apparent obliquity of the ecliptic at the date.

ω' = the mean obliquity of the ecliptic at the beginning of the Besselian fictitious year.

$\delta'\omega$ = the principal term of the nutation of the obliquity of the ecliptic; or, in other words, the correction to be applied to the mean obliquity of date in order to find the true or apparent obliquity, exclusive of short period terms. This quantity is tabulated on page 214, and is positive or negative according as the true obliquity is greater or less than the mean obliquity.

$\delta''\omega$ = the short period terms of nutation in obliquity, given on pages 231–232.

τ = the fraction of a year intervening between the instant when the Sun's mean longitude was 280° and the date for which λ or ω is required.

Then—

$$\lambda=\lambda'+\tau\,\psi_1+\delta'\psi+\delta''\psi$$

$$\omega=\omega'-0''.464\,\tau+\delta'\omega+\delta''\omega$$

Page 214 contains, for each fifth Greenwich mean noon throughout the year, certain quantities which may be described in terms of the above notation as follows: The *Precession in Longitude from 1912.0* = $\tau\,\psi_1$; the *Nutation in Longitude* = $\delta'\psi$; the *Nutation in Right Ascension* = $(\delta'\psi)\cos\omega'$; the *Nutation in Obliquity* = $\delta'\omega$, and the *Obliquity of the Ecliptic* = $\omega-\delta''\omega$, which is the true inclination of the Earth's equator to the ecliptic, exclusive of the terms depending on the Moon's longitude.

Pages 231–232 contain the values of $\delta''\psi$ and $\delta''\omega$, which are not included in the values of nutation given on page 214.

PART II.—THE EPHEMERIS FOR THE MERIDIAN OF WASHINGTON.

Page 216 contains formulæ for reducing the positions of fixed stars, including expressions for the Besselian star-numbers and star-constants, and for the independent star-numbers; the whole based upon the constants of the Paris Conference of May, 1896, and expressed in the notation of Bessel. Formulæ are also given on page 217 for computing the corrections to star places due to the effect of the short-period terms of the nutation.

Pages 218–221 contain the logarithms of the *Besselian Star-Numbers*, *A*, *B*, *C*, *D*, for each Washington mean midnight, with the values of *E* appended at the bottoms of the pages. These numbers serve to reduce the mean place of a star at the beginning of the Besselian fictitious year to its apparent place at the dates for which the numbers are given, and in ordinary cases four-figure logarithms suffice; but where extreme accuracy is desired the logarithms of *A*, *C*, and *D* are sometimes needed to five places of decimals. If used in accordance with the English and French notation, the pair of quantities *A* and *B* must be interchanged with the pair *C* and *D*; that is, *A* must be interchanged with *C*, and *B* with *D*. Along with the solar day, the first column contains the sidereal hour of Washington mean midnight for certain dates, and by interpolation among them it is easy to find the sidereal time for which any set of quantities is given.

The following is an example of the reduction of a star to apparent place by the Besselian star-numbers:

Computation of the apparent place of 36 Tauri for May 1, 1912, for the upper transit at Washington.

log a	0.5543	log b	8.1716	log c	8.5646	log d	8.7993
log A	9.2729	log B	0.9362 *n*	log C	1.1514 *n*	log D	1.1280 *n*
log a'	1.0039	log b'	9.9365 *n*	log c'	8.6733	log d'	9.3089
log Aa	9.8272	log Bb	9.1078 *n*	log Cc	9.7160 *n*	log Dd	9.9273 *n*
log Aa'	0.2768	log Bb'	0.8727	log Cc'	9.8247 *n*	log Dd'	0.4369 *n*

		h	m	s		°	′	″
Mean Place, 1912.0.	$\alpha_0 =$	3	59	5.724	$\delta_0 =$	+23	51	51.52
	$Aa =$			+0.672	$Aa' =$			+1.89
	$Bb =$			−0.128	$Bb' =$			+7.46
	$Cc =$			−0.520	$Cc' =$			−0.67
	$Dd =$			−0.846	$Dd' =$			−2.73
	$E =$			−0.001	$\tau\mu' =$			−0.01
	$\tau\mu =$			0.000				
Apparent Place, May 1,		3	59	4.901	$\delta =$	+23	51	57.46
	$-f'$			+0.011				
	$\alpha =$	3	59	4.912				

Pages 222–229 contain the *Independent Star-Numbers*, which can frequently be advantageously used instead of the *Besselian Star-Numbers*. These quantities are connected with those of Bessel by the relations given on page 216, which also contains the formulæ and precepts for the application of both systems of numbers. In order to use the Besselian numbers, it is necessary to have the values of the star-constants, a, b, c, d, a', b', c', d', while the independent star-numbers render it possible to determine the apparent place of a star without computing these star-constants. Four-figure logarithms usually suffice, but where extreme accuracy is desired the logarithms of g and h are needed to five places of decimals, and G and H are needed to one-tenth of a minute of arc. The column τ gives the fraction of a year, counting from the beginning of the Besselian fictitious year to each date.

The following is an example of the reduction of a star to apparent place by the independent star-numbers:—

Computation of the apparent place of 36 Tauri for May 1, 1912, for the upper transit at Washington

	h m		° ′
$G =$	19 34.1	$\delta_0 =$	+ 23 51.9
			h m
$\alpha_0 =$	3 59.1	$G+\alpha_0 =$	23 33.2
$H =$	15 6.2	$H+\alpha_0 =$	19 5.3

					h m s
$\log \frac{1}{15}$	8.8239	$\log \frac{1}{15}$	8.8239	$\alpha_0 =$	3 59 5.724
$\log g$	0.9739	$\log h$	1.2906	$f =$	+ 0.586
$\sin (G+\alpha_0)$	9.0670 *n*	$\sin (H+\alpha_0)$	9.9821 *n*	$(g) =$	− 0.032
$\tan \delta_0$	9.6458	$\sec \delta_0$	0.0388	$(h) =$	− 1.366
				$\tau \mu =$	0.000
$\log (g)$	8.5106 *n*	$\log (h)$	0.1354 *n*		
				$\alpha =$	3 59 4.912
					° ′ ″
$\log g$	0.9739	$\log h$	1.2906	$\delta_0 =$	+ 23 51 51.52
$\cos (G+\alpha_0)$	9.9970	$\cos (H+\alpha_0)$	9.4488	$(g') =$	+ 9.35
		$\sin \delta_0$	9.6070	$(h') =$	+ 2.22
$\log (g')$	0.9709			$(i) =$	− 5.62
		$\log (h')$	0.3464	$\tau \mu' =$	− 0.01
				$\delta =$	+ 23 51 57.46
$\log i$	0.7888 *n*				
$\cos \delta_0$	9.9612				
$\log (i)$	0.7500 *n*				

Page 230 contains for every tenth sidereal day the *Besselian* and *Independen* *Star-Numbers*, exclusive of all short period terms. They are useful in computing ephemerides of stars, similar to those on pages 287–486, for which constants containing short period terms should not be employed.

Pages 231–232 contain for Washington Mean Midnight of each day, the short period terms of the nutation in longitude and obliquity, for use in connection with the formulæ on page 217, and the coefficients, mentioned below, which are given for each star on pages 287–486.

Pages 233–250 contain the mean places of eight hundred and twenty-five stars for the beginning of the Besselian fictitious year, or, in other words, for the moment when the Sun's mean longitude is 280°. The annual variations are to be considered as the differential coefficients of each coordinate with respect to the time at the beginning of the year.

Pages 251–286 contain the apparent positions of fifteen northern circumpolar stars for every upper transit at Washington. The mean solar time of transit is given in the column *Mean Solar Date*, in order that each transit above and below the pole may be readily identified. Suppose, for example, that the transit of Polaris below the pole on January 26 is to be found, and we wish to know whether it precedes or follows the upper transit of the same date. On page 251 we find that the upper transit occurs January 26.2; the lower transit, therefore, occurs January 26.7. But the lower transit following that of July 1 (page 257) does not take place until July 2.3. Hence the lower transit of July 1 precedes the upper one of the same date. A transit occurring very nearly at noon may also be identified without a computation to ascertain the actual mean date, by simply noting the *tenth of a day in the column Mean Solar Date.*

The secant and tangent of the apparent declination for the 15th of each month and the mean place in right ascension and declination for the beginning of the year are given for each star at the foot of the page.

Pages 287–486 contain, for every tenth upper transit at Washington, the apparent places of 800 stars, being all those given in the list of mean places, except the twenty-five circumpolars. The mean solar date in the left-hand column of each page gives the day and tenth of the transit, so that intermediate transits may be readily identified; and to facilitate interpolation, the differences of each coordinate are given for every ten days.

In connection with the ephemeris of each 10-day star there are given at the foot of the page, (1) the secant and the tangent of the mean of the star's greatest and least apparent declinations during the year, (2) the seconds of the mean place in both right ascension and declination for the beginning of the year, and (3) the coefficients of the short period terms of the nutation, the use of which is explained on page 217.

Pages 487–510 contain ephemerides of ten southern circumpolar stars in all respects similar to those of northern circumpolar stars on pages 251–286.

Pages 511–517 contain the mean errors for 1920 in both right ascension and declination of the places of the 825 stars on pages 233–250 taken from *Astronomical Papers of the American Ephemeris*, Vol. VIII, Part 2, pages 370–382. They furnish data for estimating approximately the accuracy of the Mean Places of the Stars on pages 233–250.

Pages 518–525 contain the apparent right ascension and declination of the Sun, both for Washington mean and apparent noon, and the hourly motion of the Sun in these coordinates; the equation of time, the semidiameter of the Sun, and the sidereal time of semidiameter passing the meridian, for Washington apparent noon; and, lastly, the sidereal time of mean noon. The hours and minutes of right ascension and the degrees and minutes of declination are always made the same for both mean and apparent noon. In cases where they really differ, the minute which would have been numerically larger is diminished by one, and the seconds increased by sixty, so that the sum of the two remains correct. The hourly motions in right ascension and declination are given for the columns headed *Mean Noon*, but may be regarded as having the same values for apparent noon.

The *Equation of Time for Apparent Noon* is the correction to be applied to apparent time in order to obtain mean time. It is, therefore, mean time minus apparent time. Each number as given is the mean time of transit of the Sun's center over the meridian of Washington, counted from the nearest noon. The use of all the quantities is substantially the same as in the *Ephemeris for the Meridian of Greenwich*.

Pages 526–541 contain the right ascension, declination, semidiameter, and parallax of the Moon at the moment of upper and lower transit over the meridian of Washington. In previous volumes these have been given for upper transit only. The mean time given in the second column is that of transit of the Moon's center over this meridian. The differences for one hour of longitude are the amounts by which the local mean times of transit over a meridian one hour west of Washington would exceed those given in the column *Mean Time of Transit*, supposing the rate of change to be uniform and equal to what it is at the instant of transit over the meridian of Washington. The next four columns need no especial explanation, *except that the* differences for one hour of longitude are computed as if the motion of the Moon in right ascension were uniform, or, in other words, they are differential coefficients corresponding to the instants of Washington transit. By means of them, when second differences are taken into account, the position of the Moon can be computed with great exactness for the moment of transit over any meridian not more than one hour distant from Washington. To obtain the same accuracy for more distant meridians, we may proceed as follows: Let F represent either the *Mean Time of Transit*, the *Right Ascension of Center*, or the *Geocentric Declination of Center*, and let D represent the corresponding *Difference for One Hour of Longitude.* Adding twelve hours to the time of lower transit at Washington gives the time of upper transit at places whose longitude is 180° from Washington. Write down three successive values of F, together with the corresponding values of D, and difference the latter as in the following scheme; where the middle values, F_0 and D_0, belong to the culmination from which is to be derived the value of F for the culmination on the meridian whose longitude is λ:—

Function.	Diff. for 1 Hour of Longitude.	Δ'	Δ''
F_{-1}	D_{-1}	a'	
F_0	D_0	a''	b
F_{+1}	D_{+1}		

Then, for the culmination at the meridian λ

$$F_\lambda = F_0 + \lambda D_0 + \frac{\lambda^2}{48}(a' + a'') + \frac{\lambda^3 b}{864}$$

where λ must be expressed in hours and decimals of an hour, and reckoned from Washington or from 180° from Washington according as the upper or lower culmination is used for the middle value (F_0).

The columns of *Sidereal Time of Semidiameter passing Meridian*, *Geocentric Semidiameter* and *Equatorial Horizontal Parallax* do not seem to need any explanation, except that they all refer to the moment of transit. The column *Bright Limbs* is given to indicate to the observer which limbs are illuminated. When one limb is full and the terminator is within 1″ of the opposite limb, both can be well observed, and in such cases both are indicated, the defective limb being indicated by an italic letter or numeral.

Pages 542–558 contain the geocentric apparent right ascensions and declinations of the seven major planets, together with their horizontal parallaxes, semidiameters, and sidereal times of semidiameters passing the meridian, for the moments of all transits which it is usually desirable to observe over the meridian of Washington. The columns following the dates give the Washington mean times of these transits.

PART III—PHENOMENA.

This part gives the dates of the principal astronomical phenomena of the year, expressed in Washington mean time, except in the case of the eclipses, which are expressed in Greenwich mean time.

Pages 560–565 contain all necessary data respecting the solar and lunar eclipses which occur during the year.

The eclipse elements are given for the moment of conjunction of the S
and Moon in right ascension, but the subsequent tables and results are comp

from the exact positions of these bodies at the several instants referred to. The times and angles designated as the circumstances of a lunar eclipse remain the same throughout all parts of the Earth, and require no explanation beyond a mere statement of the fact that in computing them the geometrical diameter of the Earth's shadow has been augmented in the proportion of 51 : 50. The principal circumstances of each total and annular eclipse are stated in five lines on page 561, as follows:—

The line entitled "Eclipse begins" gives the Greenwich mean time at which the Moon's penumbra first touches the Earth, together with the latitude and longitude of the point of contact.

The line entitled "Central eclipse begins" gives the time when the axis of the Moon's shadow first touches the Earth, and the latitude and longitude of the point of contact follow.

The line entitled "Central eclipse at noon" gives the time when the axes of the Earth and of the shadow cone lie in the same plane. The latitude and longitude of the point where the axis of the shadow cone then cuts the Earth's surface follow, and there the eclipse will be central and the Sun will be exactly on the meridian.

The lines entitled "Central eclipse ends" and "Eclipse ends" give, respectively, the times when and the localities where these events occur, the phenomena being the converse of those denoted by the similar phrases for the beginning.

In the case of partial solar eclipses the axis of the Moon's shadow does not come into contact with the Earth, and the three lines entitled, respectively, "Central eclipse begins," "Central eclipse at noon," and "Central eclipse ends," are replaced by a single line entitled "Greatest eclipse," whereon are given the time when and the latitude and longitude where the eclipse attains its greatest magnitude. The latter phenomenon necessarily occurs with the Sun in the horizon.

Maps of the Eclipses.—The regions in which each eclipse is visible are shown upon the map relating to it, from which may be taken approximately, for any place, both the times of the beginning and ending of the eclipse and its magnitude. The dotted curves show the outline of the shadow for each hour of Greenwich mean time, and therefore pass through all places where the eclipse begins or ends at the hour indicated. To find the instant of beginning at any place, we determine by inspection between what pair of these curved lines the place is situated. The eclipse will then begin between the corresponding hours of Greenwich mean time; and the fraction of the hour may be determined by dividing the hour in the same proportion as the space representing it on the map is divided by the place in question. This division may be made a little more exact by allowing for the changes in the spaces as indicated by their varying width. The Greenwich mean time thus found must be reduced to local mean time by applying the longitude.

As an example, suppose we wish to find the times at which the eclipse of 1912, October 9–10, begins and ends at Rio de Janeiro, Brazil, latitude 22° 54′ S., longitude 43° 10′ W.

For the beginning we compare the distance of the place from the curves of 0^h and 23^h, and find it to be on the 0^h curve, thus giving for the approximate time of beginning $0^h\ 0^m$; for the end we compare the distance of the place from the curves of 2^h and 3^h, and find it to be about 50 minutes from the former, thus giving for the approximate time of ending $2^h\ 50^m$, and both of these results are probably correct to within 3 or 4 minutes.

Changing to local mean time, we shall have—

	Beginning.				Ending.		
		d	h	m	d	h	m
Greenwich mean time	October	10	0	0	10	2	50
Longitude west . . .			2	53		2	53
Local mean time	October	9	21	7	9	23	57

In the case of total and annular eclipses, a fair estimate of the magnitude of the eclipse at any place may be obtained from the position thereof relatively to the central line and to the limit. On the central line, the eclipse is annular or total, while between the central line and the limit the maximum magnitude of the eclipse is given by the quotient of the distance of the place from the limit divided by the distance of the central line from the limit; the measurements being made upon a line drawn through the place, perpendicularly to the central line.

More Accurate Computations.—A more accurate determination of the phases, as visible at any point of the Earth's surface, may be obtained from the Besselian elements which are given for every 10 minutes of Greenwich mean time. Their geometric signification is as follows:—

Let us imagine a plane passing through the center of the Earth, perpendicular to the right line joining the centers of the Sun and Moon. This latter line is the axis of the Moon's shadow, and the plane is called the *fundamental plane* or plane of xy. We take the intersection of this plane with that of the Earth's equator as the axis of x, and the center of the Earth as the origin of coordinates. The axis of y is perpendicular to that of x, and directed toward the north; x and y are then the coordinates of the point in which the axis of the shadow intersects the fundamental plane, and they are here expressed in terms of the Earth's equatorial radius as unity. The angle d, of which the sine and cosine are both given, is the declination of that point of the celestial sphere toward which the axis of the shadow is directed; or, in other words, it is the declination of the center of the Sun as seen from the center of the Moon. The angle μ is the Greenwich hour angle of this same point of the celestial sphere.

The quantities l_1 and l_2 are the radii of the shadow cones upon the fundamental plane, l_1 corresponding to the penumbra, and l_2 to the umbra, or annulus. The notation is that of CHAUVENET'S *Spherical and Practical Astronomy*, in which l_2 is regarded as positive for an annular and negative for a total eclipse.

The angles f_1 and f_2, the tangents of which are given, are the angles which the elements of the respective shadow cones make with the axis of the shadow; or, they are the semi-angles of the two cones.

In order to facilitate interpolation to any required moment, the logarithms of x', y', and μ', which are the changes of x, y, and μ, in one minute of time, are given at the bottom of the table.

The method of computing an eclipse from its Besselian elements is based on the fact that at the moments of beginning and ending the distance of the observer from the axis of the shadow or penumbra is equal to the radius of the latter at the point of observation. To find this distance and radius we proceed as follows:—

(1) The coordinates of the observer, ξ, η, and ζ, together with their variations in one minute, are computed for some assumed moment of Greenwich mean time, as near as practicable to the true time of the required phase.

(2) The coordinates x and y of the axis of the shadow, together with th variations in one minute, are taken for the same moment from the tables of elem

(3) From (1) and (2) the position and motion of the observer relative to the axis of the shadow are found.

(4) The radius of the penumbra or umbra at a distance from the fundamental plane equal to that of the observer is also computed.

(5) Then, assuming the motions to be uniform, we determine the time required for the observer to be brought to a distance from the axis of the shadow equal to this radius.

The formulæ and directions for the several steps in the computation are as follows:—

(1) Find $\rho \cos \varphi'$ and $\rho \sin \varphi'$, which are the geocentric coordinates of the station referred to the Earth's equator, ρ being the distance from the center of the Earth, and φ' the geocentric latitude. These coordinates may be obtained from geodetic tables, or may be computed from the following table based on CLARKE'S spheroid of 1866, by the formulæ—

$$\rho \cos \varphi' = F \cos \varphi$$
$$\rho \sin \varphi' = \frac{\sin \varphi}{G}$$

φ being, as usual, the geographic latitude.

Table for Computing the Geocentric Coordinates of a Place.

φ	Log F.		Log G.	
0°	0.00000	1	0.00295	1
5	0.00001	3	0.00294	3
10	0.00004	6	0.00291	6
15	0.00010	7	0.00285	7
20	0.00017	9	0.00278	9
25	0.00026	11	0.00269	11
30	0.00037	11	0.00258	11
35	0.00048	13	0.00247	13
40	0.00061	13	0.00234	13
45	0.00074	12	0.00221	12
50	0.00086	13	0.00209	13
55	0.00099	12	0.00196	12
60	0.00111	10	0.00184	10
65	0.00121	9	0.00174	9
70	0.00130	8	0.00165	8
75	0.00138	5	0.00157	5
80	0.00143	3	0.00152	3
85	0.00146	1	0.00149	2
90	0.00147		0.00147	

For the assumed Greenwich mean time of computation, take from the table of elements the values of sin d, cos d, and μ. Then, with λ for the longitude west from Greenwich, the coordinates of the observer will be—

$$\xi = \rho \cos \varphi' \sin (\mu - \lambda)$$
$$\eta = \rho \sin \varphi' \cos d - \rho \cos \varphi' \sin d \cos (\mu - \lambda) = \eta_1 - \eta_2$$
$$\zeta = \rho \sin \varphi' \sin d + \rho \cos \varphi' \cos d \cos (\mu - \lambda) = \zeta_1 + \zeta_2$$

and their variations in one minute of mean time will be—

$$\xi' = [7.63992]\, \rho \cos \varphi' \cos (\mu - \lambda)$$
$$\eta' = [7.63992]\, \rho \cos \varphi' \sin d \sin (\mu - \lambda) = [7.63992]\, \xi \sin d$$

ζ' is not needed.

(2) For the same assumed moment of Greenwich mean time, take from th tables of elements the coordinates x and y of the axis of the shadow, together wit their variations for one minute, which are equal to one-tenth of the differences o two consecutive numbers. These variations are represented by x' and y', and thei logarithms are given beneath the tables of x and y.

(3) The distance m and position-angle M of the axis of the shadow relativel to the observer, and the relative motions, n and N, are computed by the formulæ—

$$\begin{aligned} m \sin M &= x - \xi \\ m \cos M &= y - \eta \\ n \sin N &= x' - \xi' \\ n \cos N &= y' - \eta' \end{aligned}$$

(4) Both for the shadow and for the penumbra, the radius L at the distance from the fundamental plane is computed by the formula—

$$L = l - \zeta \tan f$$

l and f being found from the table of elements, and ζ computed in (1).

(5) If the time chosen for computation is exactly that of the beginning o ending of the eclipse, we shall have—

$$m = L$$

But, as this condition will rarely be fulfilled on a first trial, a correction τ to th assumed time is computed thus: Find the angle ψ from the equation,

$$\sin \psi = \frac{m \sin (M-N)}{L}$$

There will be two values for this angle, of which one will be in the first and th other in the second quadrant when $\sin \psi$ is positive, and one in the third and th other in the fourth quadrant when $\sin \psi$ is negative; but simplicity will be gainec by taking only that value of ψ for which $\cos \psi$ is positive. This value lies betwee the limits +90° and −90°. The correction τ to the assumed time of beginning o ending of the eclipse will then be found, in minutes, from—

$$\tau = -\frac{m \cos (M-N)}{n} \mp \frac{L \cos \psi}{n}$$

where the double sign is to be taken negative for the beginning and positive for th ending.

However, one such pair of values of τ can not give the times of both beginnin and ending with accuracy. To attain that, we must commence the computatio by assuming two times, one near the beginning and the other near the ending o the eclipse, both of which may be derived from the chart with sufficient exactness The computation for the first assumed time will give a small value of τ which, whe applied to the assumed time, will give the beginning of the eclipse nearly correctly and a large value which will give an inaccurate time of ending. Similarly th computation for the second assumed time will give a small and nearly correct valu of τ for finding the time of ending, and a large and inaccurate negative value fo finding the time of beginning. We shall thus deduce two times of each phase, onl one of which is to be regarded as approximately correct.

The more accurate times of beginning and ending may now be taken in place of those originally assumed, and the whole computation may be repeated, thus leading to a pair of values of τ, which should be very small and accurate. Such a repetition of the computation will in general be advisable, to guard against accidental numerical errors, but a second approximation may be obtained without it, by finding a corrected value of τ in accordance with the formulæ—

$$\delta\tau = \mp \frac{\tau\,(l' + [5.3100]\,\xi\cos d)}{n\cos\psi} - \frac{[4.9788]\tau^2}{n\cos\psi}[\xi\sin(N\mp\psi) - \eta_2\cos(N\mp\psi)]$$

$$\tau_0 = \tau + \delta\tau$$

where the double signs are to be taken negative for the beginning of the eclipse and positive for the ending. l' is the variation of l for one minute of time, and its numerical value can be taken by inspection from the table of Besselian elements.

If the resulting values of τ_0 are not greater than fifteen minutes, the corrected times of contact thus obtained will be theoretically exact within less than a second, but the uncertainties of the solar and lunar tables are such that an unavoidable error of several seconds may exist in the prediction. To guard against numerical mistakes it is better, after making this final correction, to repeat the computations so far as to obtain new values of m and L for the corrected times. If these two quantities agree within a unit of the fourth place of decimals, the times employed are generally correct within a second of time. If they differ too widely, the computer must use his own judgment as to making further corrections and computations.

Position-angle of Point of Contact.—The position-angle P, of the point of contact, reckoned from the north point of the Sun's limb toward the east, is found by the formula—

$$P = N - \psi \pm 180^\circ \text{ for the beginning,}$$
$$P = N + \psi \qquad \text{ for the ending,}$$

it being assumed that, in each case, the value of ψ is taken between the limits ± 90°.

Computation of the Solar Eclipse of 1912, October 9–10, for Rio de Janeiro.

The position of Rio de Janeiro is—

	°	′	″
Latitude, $\varphi = -$	22	54	24
Longitude, $\lambda = +$	43	10	21

and its geocentric coordinates are—

$$\rho\sin\varphi' = 9.58748n$$
$$\rho\cos\varphi' = 9.96455$$

From the Eclipse Chart we find the approximate times of the phases to be—

	d	h	m	
Beginning October	10	0	0	Greenwich Mean Time.
Ending	10	2	50	

	Beginning.			Ending.		
Greenwich Mean Time, T, October 10,		0^h	0^m		2^h	50^m
	°	′	″	°	′	″
μ	3	13	42	45	44	24
λ	+43	10	21	+43	10	21
$\mu - \lambda$	−39	56	39	+ 2	34	3

	Beginning.	Ending.
$\rho \cos \varphi$	9.96455	9.96455
$\sin (\mu-\lambda)$	9.80756 *n*	8.65124
$\log \xi$	9.77211 *n*	8.61579
ξ	−0.59171	+0.04128
$\rho \sin \varphi'$	9.58748 *n*	9.58748 *n*
$\cos d$	9.99710	9.99707
$\log \eta_1$	9.58458 *n*	9.58455 *n*
η_1	−0.38422	−0.38419
$\rho \cos \varphi'$	9.96455	9.96455
$\sin d$	9.06105	9.06385 *n*
$\cos (\mu-\lambda)$	9.88461 *n*	9.99956
$\log \eta_2$	8.91021 *n*	9.02796 *n*
η_2	−0.08132	−0.10665
$\eta=\eta_1-\eta_2$	−0.30290	−0.27754
$\rho \sin \varphi' \sin d$	8.64853	8.65133
ζ_1	+0.04452	+0.04481
$\rho \cos \varphi' \cos d \cos (\mu-\lambda)$	9.84626	9.96118
ζ_2	+0.70187	+0.91450
$\zeta=\zeta_1+\zeta_2$	+0.74639	+0.95931
const. log	7.63992	7.63992
$\rho \cos \varphi \; \cos (\mu-\lambda)$	9.84916	9.96411
$\log \xi'$	7.48908	7.60403
ξ'	+0.003084	+0.004018
const. log	7.63992	7.63992
$\xi \sin d$	8.83316	7.67964 *n*
$\log \eta'$	6.47308	5.31956 *n*
η'	+0.000297	−0.000021
$x-\xi$	−0.39564	+0.37252
$y-\eta$	+0.36208	−0.41536
$x'-\xi'$	+0.005158	+0.004225
$y'-\eta'$	−0.004724	−0.004400
$m \sin M$	9.59730 *n*	9.57115
$m \cos M$	9.55881	9.61843 *n*
$\tan M$	0.03849 *n*	9.95272 *n*
M	−47° 32′ 9″	−138° 6′ 45″
$\sin M$	9.86788 *n*	9.82457
$\log m$	9.72942	9.74658
$n \sin N$	7.71248	7.62583
$n \cos N$	7.67431 *n*	7.64345 *n*
$\tan N$	0.03817 *n*	9.98238 *n*
N	−132° 29′ 7″	−136° 9′ 43″
$\sin N$	9.86774	9.84050
$\log n$	7.84474	7.78533

	Beginning.	Ending.
$\tan f$	7.67063	7.67065
$\log \zeta$	9.87296	9.98196
	7.54359	7.65261
$\zeta \tan f$	$+0.00350$	$+0.00449$
l	$+0.54384$	$+0.54417$
L	$+0.54034$	$+0.53968$
$M-N$	$+179^\circ\ 58'\ 44''$	$-1^\circ\ 57'\ 2''$
$\sin(M-N)$	6.56639	8.53195
$\log m$	9.72942	9.74658
$\operatorname{colog} L$	0.26733	0.26787
$\sin \psi$	6.56314	8.54640
ψ	$+0^\circ\ 1'\ 15''$	$+2^\circ\ 1'\ 0''$
$\log \frac{m}{n}$	1.88468	1.96125
$\cos(M-N)$	0.00000 *n*	9.99975
	1.88468	1.96100 *n*
$-\frac{m}{n}\cos(M-N)$	$+76.680$	-91.412
$\log L$	9.73267	9.73213
$\cos \psi$	0.00000	9.99973
$\operatorname{colog} n$	2.15526	2.21467
	1.88793 *n*	1.94653
$\mp\frac{L \cos \psi}{n}$	-77.256	$+88.416$
	m	m
τ	$-$ 0.576	$-$ 2.996
	d h m	d h m
$T+\tau$	9 23 59.424	10 2 47.004

Since the value of τ for the ending is rather large, we compute the corrections $\delta\tau$ for this phase as follows:

	Ending.
const. log	5.3100
$\log \xi$	8.6158
$\cos d$	9.9971
	3.9229
number	$+0.0000008$
l'	$+0.0000015$
sum	$+0.0000023$
log (sum)	4.3617
$\log \tau$	0.4765 *n*
$\operatorname{colog} n$	2.2147
$\sec \psi$	0.0003
	7.0532 *n*

	Ending.
(1)	-0.0011
$N+\psi$	$138^\circ\ 11'$
$\sin(N+\psi)$	9.8240
$\log \xi$	8.6158
$\log \xi \sin(N+\psi)$	8.4398
$\cos(N+\psi)$	9.8723 *n*
$\log \eta_2$	9.0280 *n*
$\log \eta_2 \cos(N+\psi)$	8.9003
$\xi \sin(N+\psi)$	$+0.0275$
$\eta_2 \cos(N+\psi)$	$+0.0795$
diff.	-0.0520

	Ending.		Ending.
log (diff.)	$8.7160\,n$	(2)	$+0.0007$
const. log	$4.9788\,n$		m
log τ^2	0.9530	$+(1)+(2)=\delta\tau$	-0.0004
colog ($n \cos \psi$)	2.2150	τ	-2.996
		τ_0	-2.996
	6.8628		

The corrected time of ending is, therefore,

$$T_0 = \text{Oct. } 10^d\ 2^h\ 47^m.004$$

Whence we find—

		Beginning. d h m		Ending. d h m
Greenwich Mean Time,	October	9 23 59.424		10 2 47.004
λ		+ 2 52.690	+	2 52.690
Local Mean Time,	October	9 21 6.734		9 23 54.314

Therefore we have—

		d	h	m	s	
Beginning of the Eclipse,	October	9	21	6	44.0	Local Mean Time.
End of the Eclipse,	October	9	23	54	18.8	

	Beginning. ° ′	Ending. ° ′
$N \mp \psi$	132 27.9	138 10.7
constant	180 0.0	0 0.0
Angle of position: P	312 27.9	138 10.7

from the north point of the Sun's disk toward the east for direct image.

Moon's Phases, Libration, etc.—Page 566 gives the central standard time of the Moon's phases, apogee, perigee, and greatest libration, together with the formulæ for finding the libration in longitude and latitude whenever required. The times of the equinoxes and solstices are also given on this page.

Mean Places of Stars Occulted During the Year.—Pages 567–570 contain the adopted mean places and annual proper motions of such stars brighter than magnitude 6.5 as will be occulted by the Moon.

Elements of Occultations.—Pages 571–604 give the elements for the prediction of the times of occultations of stars and planets by the Moon during the current year. The system of coordinates employed is similar to that already described for eclipses, the fundamental plane passing through the center of the Earth, and being taken perpendicular to the line joining the star and the center of the Moon, but the cone circumscribing the Moon and star is regarded as a cylinder which intercepts the fundamental plane in a circle having the same linear diameter as the Moon.

In the columns referring to the star, those headed *Red'ns from* 1912.0 give the quantities necessary to reduce the mean place of the star at the beginning of 1912 to its apparent place at the time of occultation. These reductions are sufficiently accurate to be definitive.

Under the general head, *At Conjunction in R. A.*, are five columns giving certain quantities for the moment of geocentric conjunction of the Moon and star in right ascension, as follows:—

The *Washington Mean Time* is the moment, T, at which the two bodies are i geocentric conjunction in right ascension. At that moment the coordinate x o the axis of the cylinder on the fundamental plane has the value zero. The colu *Hour Angle*, H, gives the common geocentric hour angle of the Moon and st at the same moment, expressed in sidereal time and counted from the meridi of Washington—positive toward the west and negative toward the east. Colum Y gives the coordinate y of the axis of the cylinder upon the fundamental pla at the same moment. Columns x' and y' give the variations of x and y in on hour of mean time. The linear unit in these columns is the Earth's equatori radius. The limiting parallels, north and south, show the extreme limits of latitud within which the occultation will be visible.

By the aid of these elements, the Washington mean time of immersion and emersion of a star relatively to the limb of the Moon may be computed for any part of the Earth by a method nearly the same as that already explained for computing eclipses, but somewhat more simple.

Prediction of Occultations for a Given Place.—When it is desired to predict the circumstances of one or more occultations at any place, the first step will be to select them from the general list given in the Ephemeris. The conditions of visibility are:—

1. The limiting parallels in the last columns must include the latitude of the place.

2. The quantity $H-\lambda$, taken without regard to sign, must be less than the semi-diurnal arc of the star by at least one hour. On very rare occasions an emersion might be seen in the east, or an immersion in the west, when this difference is a few minutes less than an hour.

3. The Sun must not be much more than an hour above the horizon at the local mean time $T-\lambda$, unless the star is bright enough to be seen in the daytime.

When many occultations are to be selected, the most convenient course will be to write the value of $-\lambda$ on the bottom of a slip of paper, and in passing through the list of occultations, to pause over each one for which condition (1) is fulfilled, and examine by means of the slip whether conditions (2) and (3) are also fulfilled. If either fails, the computer passes on. Sometimes it will be difficult to determine whether $H-\lambda$ or $T-\lambda$ falls within the limits; and in such cases the computer may mark the occultation for trial and leave the decision for the subsequent operations. The whole list can be gone over in less than a day, and it will probably be found that about one-tenth of the occultations are marked for trial.

The next step will be to compute the local times of immersion and emersion from the elements, and to that end let—

T = the instant of geocentric conjunction of Moon and star in right ascension, expressed in Washington mean solar time;
H = the Washington west hour angle of the two bodies at that moment;
λ = the longitude west of Washington;
$h_0 = H-\lambda$ = the local hour angle of the star at the instant T;
δ = the star's declination.

The procedure for each occultation will then be as follows:—

(1) The geocentric coordinates of the place, $\rho \sin \varphi'$ and $\rho \cos \varphi'$, are to be computed by the formulæ and table given in connection with eclipses on page 700.

The next step will be to find the approximate instant of apparent conjunction of the Moon and star as seen from the place, and that may be deduced from the time of geocentric conjunction by the application of an approximate correction taken from Mr. DOWNES's table, printed in the volumes of the American Ephemeris for 1882 to 1899. This correction must be reckoned in mean solar hours, and will be designated by the symbol t. It will have the same sign as h_0.

When DOWNES's table is not available, the correction may be computed from the formulæ,

$$\begin{aligned} \xi_0 &= \rho \cos \varphi' \sin h_0 \\ \xi' &= [9.4192]\, \rho \cos \varphi' \cos \frac{4}{3} h_0 \\ t &= \frac{\xi_0}{x' - \xi'} \end{aligned}$$

By applying t to the Washington mean time of geocentric conjunction, as given with the elements, we shall have the Washington mean time of local conjunction within a few minutes.

(2) Compute for the instant $T+t$ the following quantities, in which t_0 is the sidereal equivalent of the mean time interval t:

$$\begin{aligned} \xi &= \rho \cos \varphi' \sin (h_0 + t_0) \\ \eta &= \rho \sin \varphi' \cos \delta - \rho \cos \varphi' \sin \delta \cos (h_0 + t_0) = \eta_1 - \eta_2 \\ \xi' &= [9.4192]\, \rho \cos \varphi' \cos (h_0 + t_0) \\ \eta' &= [9.4192]\, \rho \cos \varphi' \sin \delta \sin (h_0 + t_0) = [9.4192]\, \xi \sin \delta \\ x &= x' t \\ y &= Y + y' t \end{aligned}$$

Compute also m, M, n, N, and ψ from the equations

$$\begin{aligned} m \sin M &= x - \xi \\ m \cos M &= y - \eta \\ n \sin N &= x' - \xi' \\ n \cos N &= y' - \eta' \\ \sin \psi &= [0.5646]\, m \sin (M - N) \end{aligned}$$

ψ being taken between the limits ±90°. Finally compute

$$\tau = -\frac{[1.7782] m}{n} \cos (M - N) \mp \frac{[1.2135]}{n} \cos \psi$$

$$\delta\tau = \frac{[6.7591] \tau^2}{n \cos \psi} [\eta_2 \cos (N \mp \psi) - \xi \sin (N \mp \psi)]$$

where the double signs are to be taken negative for an immersion and positive for an emersion. Both τ and $\delta\tau$ thus have two values, which are expressed in minutes of time, and in order to distinguish them let those pertaining to immersion be designated respectively τ' and $\delta\tau'$, while those pertaining to emersion are designated τ'' and $\delta\tau''$. We then have for the Washington mean times of the phases,

$$\begin{aligned} \text{Instant of immersion} &= T + t + \tau' + \delta\tau' \\ \text{Instant of emersion} &= T + t + \tau'' + \delta\tau'' \end{aligned}$$

These expressions are practically exact, as the corrections $\delta\tau$ seldom amount to so much as 1.5 minutes, and whenever an inaccuracy of that magnitude is permissible they may be omitted. As a check upon the results, it will be advisable to compute ξ, η, x, and y for the times of immersion and emersion finally obtained. If these times are correct the quantities in question will fulfill the condition,

$$\sqrt{(x-\xi)^2+(y-\eta)^2}=0.2725$$

If $\log m \sin (M-N)>9.4354$, $\sin \psi$ will be numerically greater than unity, and no occultation is to be expected at the given place; but a very brief one may occur if the excess of the computed distance over the Moon's semidiameter happens to be within the errors of the ephemerides of the Moon and star.

The position-angle of the line from the Moon's center to the star, at the time of contact, is reckoned from the north point toward the east, and designated by the symbol P. It is computed from the formula,

$$P=N-\psi+\delta P \qquad \text{for immersion,}$$
$$P=N+\psi+\delta P\pm 180^\circ \text{ for emersion,}$$

where the angles $N-\psi$ and $N+\psi$ are taken directly from the computation of $\delta\tau$, and δP is found in degrees of arc from the expression

$$\delta P=\mp\frac{[7.3038]\tau^2}{\cos\psi}[\eta^2 \sin N+\xi \cos N]$$

In the latter formula the double sign is to be taken negative for an immersion and positive for an emersion.

The angle from the vertex, V, is also reckoned in the direction from the north toward the east, and is found from the formula,

$$V=P-C$$

where C is computed from the expression

$$\tan C=\frac{\xi+[8.2218]\tau\xi'-[4.9810]\tau^2\xi}{\eta+[8.2218]\tau\eta'+[4.9810]\tau^2\eta_2}$$

C being taken less or greater than 180°, according as the numerator is positive or negative.

The value of τ employed in the latter formula must be so taken as to correspond with the phase for which C is required.

In the volumes of the American Ephemeris for the years 1882 to 1901 instructions are given for constructing three special tables which greatly diminish the labor of computing occultations, but as these tables should contain from 4700 to 6300 quantities, and as they would apply only to the place for which they were computed, it will rarely be worth while to undertake the labor of forming them. Those who desire further information on the subject may consult any one of the volumes in question.

As an example of an isolated occultation, we will compute that of α Scorpii (*Antares*) on June 26, 1912, for Cincinnati, whose position is—

$$\varphi=+39^\circ\ 8'\ 20''$$
$$\lambda=+\ 0^h\ 29^m\ 25^s.6$$

and whose geocentric coordinates are—

$$\rho \sin \varphi'=9.7978$$
$$\rho \cos \varphi'=9.8902$$

From the elements on page 587, we have

$$T=\ 11^h\ 12^m.3$$
$$H=+\ 1\ \ 7.8$$

and

$$h_0=H-\lambda=+\ 0\ \ 38.4$$

rom the formulæ on page 707, we find the correction, t, to the Washington time of geocentric conjunction, T, to be about $+0^h\ 22^m.5$; therefore the ngton mean time of apparent conjunction is—

$$T+t=\text{June } 26^d\ 11^h\ 34^m.8.$$

:orpii (*Antares*).	Apparent Declination.	W. T. of ☌	Hour Angle.	Y	x'	y'
	° ′	d h m	h m			
	−26 14.5	June 26 11 12.3	+1 7.8	+0.7938	0.5449	−0.1213

$T+t$	June $26^d\ 11^h\ 34^m.8$
h_0	+ 0 38.4
t_0	+ 0 22.6
h_0+t_0	+ 1 1.0
$\rho\cos\varphi'$	9.8902
$\sin(h_0+t_0)$	9.4200
$\log\xi$	9.3102
ξ	+0.2043
$\rho\sin\varphi'$	9.7978
$\cos\delta$	9.9528
$\log\eta_1$	9.7506
η_1	+0.5631
$\rho\cos\varphi'$	9.8902
$\sin\delta$	9.6456 n
$\cos(h_0+t_0)$	9.9844
$\log\eta_2$	9.5202 n
η_2	−0.3313
$\eta_1-\eta_2=\eta$	+0.8944
const. log	9.4192
$\cos\varphi'\cos(h_0+t_0)$	9.8746
$\log\xi'$	9.2938
ξ'	+0.1967
const. log	9.4192
$\xi\sin\delta$	8.9558 n
$\log\eta'$	8.3750 n
η'	−0.0237
$\log x'$	9.7363
$\log t$	9.5740
$\log x$	9.3103
x	+0.2043
$\log y'$	9.0838 n
$\log y't$	8.6578 n
$y't$	−0.0455
Y	+0.7938
y	+0.7483

$x-\xi$	0.0000
$y-\eta$	−0.1461
$x'-\xi'$	+0.3482
$y'-\eta'$	−0.0976
$m\sin M$	$-\infty$
$m\cos M$	9.1646 n
$\tan M$	$-\infty$
M	180° 0′
$\cos M$	0.0000 n
$\log m$	9.1646
$n\sin N$	9.5419
$n\cos N$	8.9894 n
$\tan N$	0.5525 n
N	105° 39′
$\sin N$	9.9836
$\log n$	9.5583
const. log	0.5646
$\log m$	9.1646
$\sin(M-N)$	9.9836
$\sin\psi$	9.7128
ψ	+31° 5′
const. log	1.7782
$\log\frac{m}{n}$	9.6063
$\cos(M-N)$	9.4310
	0.8155
$-\frac{[1.7782]\,m}{n}\cos(M-N)$	−6.54
const. log	1.2135
colog n	0.4417
$\cos\psi$	9.9327
	1.5879
$\mp\frac{[1.2135]\cos\psi}{n}$	∓38.72
τ for immersion	−45.26
τ for emersion	+32.18

of $\delta\tau$ for the two contacts is as follows:

	Immersion.	Emersion
$N \mp \psi$	74° 34′	136° 44′
$\cos (N \mp \psi)$	9.4251	9.8622 n
$\log \eta_2$	9.5202 n	9.5202 n
log (1)	8.9453 n	9.3824
(1)	−0.0882	+0.2412
$\sin (N \mp \psi)$	9.9840	9.8359
$\log \xi$	9.3102	9.3102
log (2)	9.2942	9.1461
(2)	+0.1969	+0.1400
(1) − (2)	−0.2851	+0.1012
log [(1) − (2)]	9.4550 n	9.0051
const. log	6.7591	6.7591
$\log \tau^2$	3.3114	3.0152
colog ($n \cos \psi$)	0.5090	0.5090
$\log \delta\tau$	0.0345 n	9.2884
	m	m
$\delta\tau$	− 1.08	+ 0.19
$\tau + \delta\tau$	− 46.34	+ 32.37
	d h m	h m
$T + t$	June 26 11 34.8	11 34.8
ashington Mean Time of Phase,	" 26 10 48.5	12 7.2
λ	+0 29.4	+0 29.4
Cincinnati Mean Time,	June 26 10 19.1	11 37.8

To find δP and P:

$\log \eta_2$	9.5202 n	$\log \xi$	9.3102 n	(3)	−0.3190
sin N	9.9836	cos N	9.4311 n	(4)	−0.0551
log (3)	9.5038 n	log (4)	8.7413 n	(3) + (4)	−0.3741

	Immersion.	Emersion.
log [(3) + (4)]	9.5730 n	9.5730 n
const. log	7.3038 n	7.3038
$\log \tau^2$	3.3114	3.0152
colog cos ψ	0.0673	0.0673
$\log \delta P$	0.2555	9.9593 n
	°	°
δP	+ 1.8	−0.9
$N \mp \psi$	74.6	136.7
const.	0.0	180.0
Angle of position: P	76.4	315.8

from the north point of the Moon's limb toward the east, for direct image.

Occultations Visible at Washington, pages 605–606.—Here are given in detail all the data necessary for observing every occultation of the general list which is visible at Washington during the current year.

Phenomena of Planets and Satellites, pages 607–647.—These are, for the most part, sufficiently explained in the body of the work, but the following additional explanations may be of service in some cases:

Disks of Mercury, Venus, and Mars, pages 607–609.—The angle θ, needed in reducing meridian observations, is the angle which the arc of the great circle from the planet to the Sun makes with the arc from the planet toward the west, reckoned in the direction west, north, east, south. This position-angle is reckoned from 0° to 360°, as in the measurement of double stars, the planet taking the place of the central star, but its measure is 90° greater than in the case of a double star.

We may also regard θ as expressing the angle which the line of cusps makes with the meridian, the positive direction of the meridian being toward the north, and the positive direction of the line of cusps that in which a person following this line would have the illuminated portion of the disk on his right.

Satellites of Jupiter, pages 610–635.—The abbreviations designating the phenomena are explained at the foot of each page. The differences in right ascension and declination between Jupiter and the sixth and seventh satellites are given on page 613.

Satellites of Saturn, pages 636–643.—The explanations are given on page 637, the Washington mean times of greatest elongations on pages 637–639, and the apparent elements of the rings on page 640. The differences in right ascension and declination between Phœbe and Saturn are given on page 639.

Tables for predicting the position-angles and distances from the center of the planet are given on pages 641–643. Formulæ at the foot of each page give the method by which the tables are to be used.

Satellites of Uranus, pages 644–646, contain the diagram and ephemerides of the satellites, their position-angles and distances from the center of the planet, and also tables for predicting the position-angles and distances of the satellites from the center of the planet, similar to those for Saturn.

Satellite of Neptune, pages 646–647.—These pages give the diagram and ephemeris of the satellite, the position-angles and distances from the center of the planet, and also a table for predicting the position-angle and distance from the center of the planet, similar to those for Saturn.

Phenomena, pages 648–649.—The predicted times of the conjunctions, quadratures, and oppositions of the planets with respect to the Sun are respectively the instants when the longitude of each planet differs from that of the Sun by 0°, ±90°, or 180°.

For the conjunction of the planets with the Moon, and with each other, the predicted times are the instants when the two bodies have the same right ascension. The degrees and minutes to the right show the difference of declination at the moment of conjunction.

Positions of Observatories, pages 650–659.—The latest available data have been used in compiling these positions, and many of them have been furnished through the courtesy of the directors of the several observatories in response to a circular issued by this office. The values given for *Log* ρ and the *Reduction to Geocentric Latitude* are based upon CLARKE's spheroid of 1866. See page XII.

Page 660 contains an example in the computation of lunar distances, which is inserted because the lunar distance tables have been omitted from the Greenwich Ephemeris, Part I.

Pages 661–683 contain a series of tables numbered I to VII for facilitating the determination of latitude and azimuth from observations of the Pole Star (*Polaris*).

Table I gives, for every two days, the apparent right ascension and declination of Polaris, as well as the central standard times of upper and lower culmination, and of east and west elongation of that star, together with the sidereal time of mean noon for the meridian of Greenwich.

Tables II and III, for the conversion of sidereal into mean solar time, and vice versa, are the same as in former issues of the American Ephemeris and Nautical Almanac. Table III may be used as an interpolation table for finding from the last column of Table I the sidereal time of mean noon at any place, using the longitude of the place as argument.

Table IV, computed for latitude 45°, is an expansion of Table IV of previous issues of the American Ephemeris and Nautical Almanac, and is intended for the use of navigators. It is more accurate than the old table, even when uncorrected by means of the auxiliary Table IVa, and is perhaps no less convenient. For many purposes it is sufficiently accurate for determination of latitude by surveyors.

Table V, for the determination of azimuth from Polaris at all hour angles, may be used for the rough determination of azimuth on land, and with the necessary instruments may be used for finding the compass deviation at sea.

Table VI, intended for the use of surveyors and astronomers, gives the azimuth of Polaris at elongation, with vertical argument the latitude of the place of observation, and horizontal argument the declination of the star, which latter is to be taken from column three of Table I.

Table VII, which gives for middle northern latitudes the necessary data for determination, without instruments, of the meridian when the time is unknown, will occasionally be found useful on both land and sea.

The following-named persons were engaged in the preparation of the American Ephemeris and Nautical Almanac for the year 1912:

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